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EDITORIAL.

MR. BERNARD SHAW'S "PREFACE ON DOCTORS."

Just why the medical profession should be more sensitive to criticism than any other profession has always been an enigma to a goodly number of its intelligent members; and though they have sought for the reasons with commendable powers of observation, and quite sedulously, they are really as much in the dark to-day as when they first prosecuted their investigations. One would think that the life which the general practitioner leads would make him look things squarely in the face and regard all the barbed shafts of criticism as expressions of ignorance, and as such to be dismissed at once with scant notice. But such is not the case, and more's the pity, for whenever a critic arises to make mention of his shortcomings there is invariably an exhibition of temper on his part, that does not bespeak complete confidence in himself or the possession of manners which are worthy of imitation. Now in the case of Mr. Bernard Shaw, whose criticism on doctors* is at present being read with considerable avidity, ignorance cannot be made the specific charge, nor can it be said in all fairness that a quota of the truths he wishes to drive home are tinged with exaggeration. We may say that some of his statements are fantastic and smack too much of his elfin propensity to upset our most cherished and conventional manner of thought; but even admitting this, there are enough statements in his essay that need not necessarily make us squirm and go red in the face on account of their verity and trenchancy, but must—and now we are taking the intelligence of numbers of medical men for granted—bring home to us the thought that perhaps a jolt such as this will be productive

*The Doctor's Dilemma, Getting Married, and the Shewing-Up of Blanco Posnet. By Bernard Shaw. New York: Brentano's. 1911.

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of an introspection on our part that will make us aware that our foibles are not so few and far between but that they may be seen by a critic even less acute than Mr. Bernard Shaw.

The attacks to which we are accustomed are the sort which are so virulent or so stupid that they breathe all those prejudices that are most illuminating in indicating to us, in no reserved terms, that the science of medicine is a very traduced science when filtered through the usual lay mind. Who has not read the serio-comic strictures which the literary (?) monthlies publish in the hope of attracting readers ever on the alert for sensations? Who has not been bored to distraction reading about the multifarious diets which restore to perfect health those afflicted with all sorts and conditions of disease? Whether it is Upton Sinclair, who believes in the starvation system, or some other oaf who has a theory for the restoration of health, despite the onset of a disease that medical science knows to be incurable, there is the same monotony in all the outpourings. But beside the monotony there is the dangerous note: the panacea that promises to all who shall obey the various crotchets, a complete annihilation of all the discomforts which may arise from a grave disorder; and when inconveniences are placed in abeyance is not the disease itself vanquished? Such credulity, we imagine, would arouse Mr. Shaw's scorn and move him to Gargantuan laughter, for is not one of his dicta the very sane one: "Do not try to live for ever. You will not succeed"?

Now Mr. Shaw has no sovereign remedy to offer other than the one which is at our very doors, but which the public in its ignorance has thrust aside as less effective than huge bottles of medicine. Of course, in certain rare moments in the life of the ordinary individual, there is a partial realization that soap, fresh air and sunshine must have a bearing on health; but this thought is fleeting and its dissipation is complete directly the conversation turns on a cure effected by some doctor in circumstances that are not extraordinary to the medical mind, but are quite out of the common to the uninitiated layman. And it is just account of the credulity of the public in matters such as these that Mr. Shaw waxes indignant, and his quarrel is not only with the doctors, who do not discourage this puerile talk, but with the public itself for its high regard for the ordinary in medicine and its disregard of the tenets of private and public hygiene. As a champion of preventive medicine—and even those physicians who are ever on the alert to increase the number of their patients, so that they shall be objects of envy to the lesser medical fry are enthusiasts as regards this matter—Mr. Shaw leaves nothing to be desired, and by his advocacy of a sanity that cannot be questioned places himself in the front rank of our medical philosophers,

who know what fresh air and soap stand for in the matter of preventable diseases.

If we disagree with what this keen observer says about vivisection and vaccination, we must not forget that he, as a literary man of socialistic tendencies, and one, moreover, who has a whimsicality that cannot refrain from thrusting pin-pricks into all laws that interfere with personal liberty—he even attributes souls to animals like another St. Francis or St. Anthony—is militantly against coercion in any form whatever. This is a point of view that can never be ours, for we were brought up to believe otherwise; but even so, what so thorough a critic as Mr. Shaw says should not go unheeded. And this is written not because the writer of these lines is carried away by any one point which the essayist advances, but because it is always well to know how certain phases of our medical advancement impress a thinker of originality.

It is an altogether different matter when Mr. Shaw expatiates on poor doctors, rich doctors, "fashionable diseases," and last but not least, those nurses who gossip so delightfully to their patients against all the doctors in the community, save the doctor who happens to be in charge of the case. Here he is on his own ground as critic and philosopher. He knows how poorly some members of the profession are paid and what a struggle it is for them to eke out an existence, and his solution is that the State should intervene and convert them into Medical Officers for their own sake and for the good of the community; for, as he puts it, "nothing is more dangerous than a poor doctor," meaning that he must live and that on account of the fearful struggle his judgment in the sick-room may not always be the best. He knows the avarice of some of our "prominent men" and something of their charges, even though he does not mention how at present they are reaping a harvest from Professor Ehrlich's discovery by demanding the most exorbitant fees. He knows the "fashionable diseases" which have been the butt of many a witticism, and for which he blames the public more than the doctors—a public that insists upon being heroes and heroines of the operating table. And he knows how a trained nurse advertises the one doctor who employs her and disparages the other doctors who have not favored her. But despite his unlimited survey of these matters, he is no enemy of the medical profession, but a critic whose penetration is the sort that unfolds before us certain foibles which we have somehow overlooked or been ashamed to acknowledge as positive weaknesses. Juxtaposed with the articles of no depth or literary character which flood our reviews and are only too often written by medical men who are aspiring after laurels in the literary world, this essay of Mr. Shaw's has all the superior claims which come from mentality, undauntedness, and an unusual amount of wit.

FEMALE EDUCATION.

The effects of college life on girls seem destined for a rigid investigation on account of the frequency of the charge that though it makes most of them more fit to struggle for existence, individually, as celibates, it really unfits them for the team work of the larger and more natural family life of maternity. Man's education is very largely, if not exclusively, designed to increase his efficiency as the head of a family, struggling for its existence with the aid of woman. The greatest social good is, of course, the ultimate aim and will come as a matter of selection; but in discussing the methods most likely to survive, we must remember that society is composed of families, not individuals, and the proper family life is our goal. Physicians must take a larger part in these investigations of the pedagogues, for the question of physical and nervous fitness is the paramount factor after all. The marriage- and birth-rates of the alumnæ are, therefore, of vital importance, for though we must confess that some of these women are of types not worth perpetuating, yet as a class they should produce a more intellectual generation than girls too stupid to accept education. It is charged and denied that too few alumnæ marry, and too late at that, and even these produce too few offspring. We are soon to receive more accurate information, but in its interpretation we must not forget that a woman, who raises two of her three infants, is doing better social work than she who raises only two of her eight or ten, and this irrespective of the possibly higher intellectuality of the former two, who receive better nourishment and care as a rule—and the cost is far less for the result. There are hosts of women, by the way, who assert that the divinely imposed task of replenishing the earth has been completed, and that an average family of two surviving children is all that God now demands. Those who persist in raising large families are only preventing the marriage or reproduction of others, if the average number of children cannot be more than three. In this view of the case the alumnæ may size up better than the rabbit-like lower types.

The physique of college girls, therefore, seems to be of more importance than that of boys, and we, as a profession, are virtually interested in the repeated charge that too many of the female students are injured by poor food and excessive indoor confinement in rooms badly ventilated and othewise unsanitary. Making due allowance for exaggerations and even baseless assertions, there must be some truth in the charges or they would have been refuted long ago. There must be room for improvement at least. At the same time, conditions cannot be so very

bad, if the alumnæ are able to raise such a high percentage of their offspring as we are so often told they do. The physique cannot be bad to do that, even if it is so frail that three pregnancies are the limit of endurance. What is the use of twenty conceptions, if eighteen of the products are to die before maturity, mostly in the first year of extra-uterine life? It really seems that the female physique is getting frailer in civilization, making a reduced birth-rate necessary. If the colleges turn out women strong enough, we need not try to make them stronger. The point to prove, is whether they are not made weaker.

The character of female education may seem foreign to our sphere of sanitation, yet it has a close relation to the physique. Co-education now seems doomed, from the overwhelming proofs that the rates of mental development of boys and girls are so different, and the mental characters also, that the two sexes cannot possibly keep pace without one lagging and keeping back the other, or being unduly strained to keep up. Girls naturally surpass the boys and yet are dreadfully strained in some ways in the competition. The curriculum in the female college should, therefore, not be patterned after that of male schools, and we notice as a fact that the trend is now toward domestic economy in the former with a view of making the alumnæ better partners in a life team, not necessarily wage-workers. Nevertheless, the woman who is born with more brains that necessary for a human cow, must not be starved intellectually. Her higher life is of great importance and is entitled to consideration in education—not to be made masculine, but for sheer enjoyment of living. Should such training reduce her procurative powers, no special harm is done. It is now quite generally accepted that the social organism is evolved to preserve the families in existence, and the families are not bound to provide material for the future, which looks out for what then exists. The old idea, of doing something for one's country, is a survival of the time when boys were needed to sacrifice in war to preserve the family and nation. To make fine mothers may be a big part of the aim of college life, but it is not all by a long shot; nor should it be, for Sparta tried it, but Spartans in time became noted for stupidity, and sank into nothingness by the side of more intellectual neighbors, who did not try such absurd eugenics.

DR. WARREN B. OUTTEN: AN APPRECIATION.

By the death of Dr. Warren B. Outten, the medical profession of St. Louis has lost a member of sterling worth. The sanity of his outlook, the soundness of his judgment, the clarity of his thought, stood him

in good stead in all those complications of life which fall to the lot of the physician who enjoys a large practice. These are qualities the possession of which is an asset greatly to be desired; but in Dr. Outten, they were ballasted by yet another attribute—namely, an unquenchable desire to work unremittingly, so that the ideal he seemed always to have in view could be better and better realized. And during our long acquaintance with him this was the lesson we culled from his endeavors, and a very good lesson it was, for it taught us that mental sobriety in all its manifold workings is sure of results, whereas vagaries and crotchets are certain of failure.

To review the life of Dr. Outten, in all its details, would require greater space than could possibly be obtained in a page of this JOURNAL, and would moreover be a twice-told tale, as the important points have been dwelt upon in nearly all the obituary articles which have appeared in the lay and medical press. But what concerns us here more than his positions in the Humboldt Medical College, the St. Louis Medical College and the St. Louis College of Pharmacy; his executive ability in organizing the St. Louis Hospital of the Missouri Pacific Railroad and other railroad hospitals; is the fact that from 1899 to 1901 he was editor of the INTERSTATE MEDICAL JOURNAL. In this capacity he acquitted himself as only one of his mental attitude and intellectual attributes could, and whether it was a matter of judgment that was required or the careful and painstaking editing of the various papers that fall to an editor's lot, there was always present the critical mind that is unafraid of candor.

OPINION AND CRITICISM.

ACAPNIA AND SHOCK.

The preliminary rumble of an earthquake in our conception of medical and surgical shock is now being heard. To most of us the shock of to-day is the shock of Crile, described over ten years ago as a state of vasomotor failure. Yet recent studies tend to show that in shock there is not only a failure of the vasomotor centre, but even perhaps heightened activity. The work of Porter and Quinby, of Seeley and Lyon in this country, of Malcolm in England, seems to have settled this point. But until the present no definite explanation of the fall of blood-pressure which is invariably associated with severe shock has been offered, until Henderson of Yale brought forward his "Acapnia" theory (acapnia meaning diminished carbon dioxide in the blood). The splendid evidence gathered about this theory seems almost to have solved the problem.

It is practically agreed among physiologists that the stimulation of the respiratory centre depends upon carbon dioxide alone, oxygen playing a passive part. If one takes several deep breaths, the cessation of respiration following is due purely to temporary diminution of carbon dioxide or acapnia. Henderson showed that excessive artificial respiration was followed by symptoms identical with surgical shock; rapid pulse, fall in blood-pressure, and other manifestations of shock were present, and blood-gas analyses proved that the oxygen was unchanged, whereas carbon dioxide was greatly diminished. Further, when he reduced the carbon dioxide in the blood by opening the abdomen and exposing the viscera to a current of absolutely non-irritating warm moist air, the arterial carbon dioxide was sufficiently diminished to produce all the symptoms of shock. In all these experiments the inhalation of carbon dioxide succeeded in resuscitating the animals. If the carbon dioxide content of the blood is reduced so markedly as to be insufficient to stimulate the respiratory centre, the cessation of respiration may be so long as to cause death,—that is, if it lasts eight minutes. Vigorous artificial respiration in dogs for thirty-five minutes produced fatal respiratory failure. The same result was obtained by making the animals produce their own acapnia by means of vigorous respirations following stimulation of the sciatic nerves.

The clinical bearing of these researches seems to be as practical as it is fascinating. It is not altogether rare to see respiratory failure follow

a long period of excruciating pain associated with excessive panting respiration, while the heart may beat for a short time. In this case the condition is the same as in vigorous artificial respiration in dogs. Henderson also applies his theory very prettily to anesthetics. For instance, if the state of acapnia is produced by severe pain there is not sufficient carbon dioxide in the blood to stimulate the respiratory centre which is kept going by the afferent impulses. The exhibition of morphia or of some other anesthetic cuts off these afferent impulses, and respiration ceases. This may explain many deaths on the table. If the drug had been given in the beginning before the development of acapnia, the fatal result might not have followed. The importance of the failure of respiration in shock is shown by the experiments of Crile, who expounded the doctrine of vasomotor exhaustion, for most of his animals died of cessation of breathing before the heart stopped beating.

Henderson's theory applies also to those animals in which the heart stops before respiration fails. His researches show that the heart is absolutely dependent upon the supply of venous blood, and that when this fails the heart cannot supply enough fluid to the vessels, and consequently blood-pressure falls. Acapnia causes this venous failure both by lowering venous pressure directly and causing changed osmotic conditions in the venous circulation. As a result, fluid exudes from the veins into the tissues; the supply of venous blood to the heart diminishes, and blood-pressure falls. During this stage inhalations of carbon dioxide and intravenous infusions of a saturated solution of carbon dioxide are of value. Soon, however, the gradual decreasing amount of blood causes the development of venous asphyxia, acidosis, and acute diminution of the amount of circulating blood; and, finally, the heart fails for lack of something to work upon.

This theory can be extended clinically to all cases of excessive respiration following severe pain, and it may apply to cases of shock following laparotomies with extensive loss of carbon dioxide from the abdomen. Whether there is a purely medical application remains to be seen. In acute infections there are frequenty changed osmotic conditions and water retention; in pneumonia, there is in addition excessive respiration and in fatal cases a condition much like surgical shock.

THE WASSERMANN REACTION IN THE MATTER OF PATERNITY.

To medical investigators of an inquiring nature, it has always been an alluring subject to ascertain the paternity of children, though it has never been explained whether this was done for the sake of tracing hereditary traits or for further knowledge in the matter of in-

herited diseases. But, all the same, the subject has been on the *tapis* for many a year, even before eugenics was promulgated and the excuse could be made that the betterment of the human race depended on the physical fitness of the father and the state of his morals. Especially has this matter been of interest where illegitimate children have proved their right to live by reason of mental gifts far above the ordinary, and which could be explained only—unless they were thought to be *lusus naturæ*—on the ground that their progenitors were of such mental endowment that this attribute completely overshadowed the inferior mentality of their plebeian mothers. Fortunately for these students of the untoward in nature, a new era has begun which should hearten them in the possible realization of their wishes in regard to the paternity of children, especially if these bear the stigma of syphilis.

At a recent meeting of the Medical Society of Vienna, Dr. Hochsinger reported the case of two infants, aged three weeks and three months, respectively, who had yielded a positive Wassermann and had unmistakable signs of congenital syphilis. The parents, upon being questioned, stoutly denied ever having had syphilis, and upon the Wassermann test being made it proved to be negative. Nothing daunted, and evidently an investigator who was bent upon finding out who the fathers of the children were, Dr. Hochsinger plied the women with questions until they confessed the truth. The two inamoratos were found and Dr. Hochsinger's endeavors were rewarded, as both men gave a positive Wassermann reaction.

Thus can be plainly seen that a new chapter in socio-medical science has been written, that may lead to all the light required in the investigation of the real paternity of a child that is the unhealthy offspring of healthy parents. Of course, for the medical investigator who is more interested in the workings of the Wassermann reaction than the preservation of the marital bond, an undertaking such as we have described is fraught with interest; but, while this cannot be denied, is this sort of research justifiable, even though the test might entrap the culprit? The child's symptoms indicated the character of the disease beyond a doubt; but was the diagnosis made a whit more certain by the test applied to its real father? Assuredly not.

Taking a scientific means for ascertaining a disease out of its proper environment, and transplanting it to a domain to which it does not belong, is a very mischievous performance, indeed. It is mischievous for more reasons than need be dwelt upon here; but one objection must be mentioned, and that is its manifold applicability directly its power for detection becomes known to the laity. In fact, as a result of what has already been written on syphilis in the lay press in the last few months, the minds of only too many readers are already beset with the idea that few, if any, of the people they meet are free from the disease. Hence, are we wrong in stating that with the added knowledge of the Wasser-

mann reaction, which, by the way, has not as yet been exploited in the press, the time is not far distant when doctors will be pleaded with by suspicious husbands to make the test in the hope that the illegitimacy of their children and the unfaithfulness of their wives may be proved.

LITERARY NOTE.

A very interesting and fascinating book, indeed, is Dr. Charles J. Whitby's "Makers of Man," which has recently been published by the Rebman Company (New York). The forty men, who are discussed from many points of view, divulge to us, the lesser men of the world, that in them are all those qualities we see about us daily, though, of course, so sublimated that the superficial observer is not aware of this fact. What Dr. Whitby does in his book is to mow down all those trimmings with which criticism has hitherto garnished its definition of genius by making it something so abnormal, so elusive, that it passed the understanding of man. To effect his candid exposé of the matter, the author shows in detail the physical and mental characteristics of the types under discussion, as well as the natural history of purpose and the value of individuality which shape them for their life's work. This is not the higher criticism, so much sought after, both by medical and lay readers, but the sort of writing that is explanatory of much that is completely lost under the avalanche of technicalities with which the perpetrators of the former succeed in beguiling their readers into the thought that only what is involved and startling should be read and carefully weighed. The simplicity and logic of the book cannot be too highly praised, though on second thought, there is something else that should receive the greatest meed of laudation—to wit, the absence of all thought that abnormal sexuality must be present in the majority of men of genius, otherwise their lives and works cannot be satisfactorily explained, at least not by a medical writer.

ORIGINAL ARTICLES.

THE TREATMENT OF MALARIA.

By Frank Sherman Meara, Ph. D., M. D., of New York,
Professor of Therapeutics in the Cornell University Medical College; Associate Attending Physician to St. Luke's Hospital; Assistant Attending Physician to Bellevue Hospital, New York.

From the barks of the various species of cinchona is derived an alkaloid, called quinine, and this quinine is more truly a specific than any other drug in the whole pharmacopeia.

The treatment of malaria resolves itself pretty much into the skilful use of quinine; hence, the motif of this paper is its use.

The rôle of the mosquito, the anopheles, the varieties of the lowly order of animal life, the sporozoa, the stereotyped clinical manifestations of chill, fever and sweat and the intermittent or remittent temperatures in malarial infection are familiar to us all.

While we are interested in the differentiation of the manifestations of the disease, into the tertian, quartan or estivo-autumnal forms, as based on the variety of the invading organism, the degrees of severity after all depend rather on where the infection occurs than on what organism is present. In the Northern States we have to treat relatively mild cases; in the South much more severe and some pernicious types; and in the tropics many pernicious cases.

Considering first the milder cases as seen here in the North, some of them are so slight that the patient may object to going to bed. The ordinary attack, however, compels the patient to seek rest.

In any case our results are better when the patient does go to bed and is made to observe rest.

Rest.—The difference between the appearance of the shaking, fevered or sweating patient of one day and the apparently well individual of the next, is one of the most striking contrasts of medicine.

During the period of intermission, the patient feels so well that he will often rebel against remaining in bed and greets his physician sitting up and dressed on the occasion of his next visit.

In the milder cases, no strenuous objection to this performance need be voiced; but, if the paroxysm has been severe, the patient should be

assured that his remaining at rest facilitates success in aborting the second. In the remittent estivo-autumnal forms it should, of course, be insisted upon. Each individual paroxysm means an intoxication, and as the result of this and the marked pyrexia accompanying it, tissue destruction has been entailed which makes all the more imperative the economy in the body's energies accomplished by rest of the tissues attacked by the organism. The one tissue in which a gross lesion occurs, is the red blood-cell and its destruction induces a degree of anemia. Now, in untreated cases or badly treated cases, emaciation and anemia of a marked grade ensue and the necessity for rest is as urgent as in other infections of long continuance. With prompt treatment this does not obtain, and after an anticipated paroxysm fails to appear the patient may be allowed to get up.

Bed.—On account of the brevity of the attack, when well treated, one may be less insistent on the nicety of details with reference to the bed than in the infectious diseases of longer continuance, if it entails extra expense in the procuring; but in severe cases, in pernicious types with continued fever, we economize the strength both of the patient and attendant and enhance the success of our treatment if an iron half-bed with woven wire-springs and firm mattress, which is best illustrated by the hospital bed, is used.

Room.—If the patient is still in a malarious district his room should be so chosen that the chances of further infection are lessened. By selecting one in the upper part of the house, since the invasion by the mosquito is less likely, and making doubly sure by the use of screens or mosquito netting, this object is accomplished. This, too, affords a certain protection to attendants.

In other respects the room should be chosen in severe cases according to the same criteria that obtain in other acute infections, with a view to size, ventilation, light, access to the open air by veranda and nearness of bath-room, simplicity of furnishings and remoteness from disturbing elements of the household.

Diet.—The suddenness of the attack, the anorexia, nausea and vomiting contraindicate any effort at nourishment during the paroxysm. During the afebrile periods of the intermittent type of fever, semi-solid or solid food of a smple character may be taken, but at any meal occurring within six hours of the anticipated recurrence of the paroxysm the food should be fluid or semi-solid, as milk, eggs, cereals or toast. This is in consequence of the vomiting that may ensue.

If the fever is of the remittent type, the same precautions should be observed at the periods of the paroxysm, but in the intervals the diet, while it should be somewhat restricted in the choice of food, should nevertheless contain sufficient nutritive value in terms of calories and proteid; some 2,500 to 3,000 calories and 70 to 100 grams of proteid.

Symptomatic Treatment During the Paroxysm.—The three stages of the paroxysm are each provided with their own particular form of discomfort for the patient and demand pretty constant attention and ministration to mitigate their evils.

Beginning with chilly sensations, followed by shiverings and then shakings, with the skin covered with "goose-flesh," pale, cyanotic, the face pinched and the teeth chattering, the patient can only complain of the cold and beg for warmth.

One does everything possible to afford this, by putting hot-water bottles to the feet, wrapping flannel about the extremities, heaping on blanket after blanket and giving hot drinks, hot water, weak tea, hot weak milk, into which a dash of ginger may be stirred, hot lemonade, a little hot whisky or brandy.

One other feature of this stage often requires interference—namely, vomiting.

If there is much useless retching, a draught of warm water may help to effect an evacuation of the stomach; then simple measures to stop further vomiting may be pursued, as sipping of effervescent drinks or putting a mustard paste on the epigastrium.

If the retching cannot otherwise be overcome, administer morphine hypodermically, in doses of gr. 1/12 or gr. ⅛.

In the old and feeble, symptoms of collapse may threaten during the chill. These are to be met by hot drinks of coffee, brandy or whisky, or a teaspoonful of aromatic spirits of ammonia in water; or a little strong water of ammonia may be inhaled from a towel or handkerchief held a little way from the nose.

This stage lasts from a quarter of an hour in light cases to two hours in very severe ones; and then come occasional flushings of heat and gradually there is established the febrile stage.

Fever.—In a few minutes the patient is "burning up with fever," complaining as bitterly of the heat as he was of the cold shortly before. The face is flushed, the whole skin red, the pulse bounding.

The hot-water bottles are removed, blanket after blanket comes off, until only a sheet remains; bits of cracked ice are sucked, cold water or cold lemonade is sipped, cool sponge baths given or sponges of water containing alcohol. A light rub with the hand, using 25 per cent. alcohol in water, affords much comfort.

Headache is the feature of this stage as vomiting is that of the chill, though occurring also in the first stage. This is relieved by cold cloths, wrung out of ice-water and applied to the brow. The cold sponging mentioned lessens the intensity of the headache. If, however, it is intense and not lessened by the measures advised and, especially, if delirium accompanies it, morphine in small doses hypodermically, gr. 1/24 to gr. 1/12 may be given. Coal-tars should not be used.

This stage lasts usually from four to six hours and then as the fever

declines, perspiration appears on the face and forehead and the third stage of sweating is ushered in.

Soon the whole body is covered with a drenching sweat and, except for the discomfort of the sweating, the patient grows rapidly better. Relief is afforded the patient in this stage by rubbing the body with dry towels and changing the linen. He may be allowed drinks of water or lemonade freely.

If symptoms of collapse intervene, as but rarely occurs, hot drinks and stimulation as advised during the cold stage should be given. Sleep usually follows this stage.

Such are the events and their treatment in the milder cases of tertian and quartan fevers of this latitude.

Of the estivo-autumnal fevers of the North, it may be said that they are more severe than the other types, but very rarely pernicious. The nervous symptoms and the aching pains of the limbs and back are more striking and the paroxysm is much longer, usually over twenty-four hours and often permitting but a few hours of intermission or remission.

Specific Treatment.—As I have said quinine is looked upon as more truly a specific than any other drug in use, and yet its specificity is due to effects not confined to the plasmodium malariæ alone, but common to all protoplasm.

In general it is a protoplasmic poison. At first and in slight doses, this action on protoplasm is expressed by an enhancement of function, that is, stimulation; but this in turn, in sufficient dosage, is followed by depression of function, paralysis of same and death. That this action varies in degree in different stages of cell-growth and cell-activity is also true and upon this fact depends its usefulness as a drug.

Now, the protoplasm of the malarial organism seems peculiarly susceptible to it, but by no means equally so at all stages of its development. It is so much more susceptible to quinine than the body-cells, that amounts that will kill the plasmodium have no deleterious effects on the latter.

It is during the stage when development and nutrition are most active, that is in the young stage of the parasite, that quinine is most operative. This fact has a practical bearing on the administration of the drug.

Time of Administration.—Many rules are given by numbers of physicians with reference to the time of administration, and by some of them with an insistence on exactness that would seem to attribute more of the success to this item in technique than to the drug itself. Facts about the absorption and excretion of quinine are as follows: Within thirty minutes evidences of it are found in the urine. In six hours half of it is eliminated, but after that the elimination is more tardy and traces of it can still be found in the urine after seventy-two hours.

Sporulation—the setting free of the young parasites in the blood-stream—occurs at the time of the chill. We should theoretically get the best results by a large dose given three or four hours before the

anticipated chill, at a time when the maximum amount of quinine would be in the circulation to act upon the organisms during their egress from the red blood-cells. We may, then, a few hours before the paroxysm give our maximum dose. It goes without saying that this will in no way abort the coming chill, as the organisms responsible for that are protected in the red blood-cells; but it will destroy their offspring and abort the chill for which they would be responsible forty-eight or seventy-two hours later.

Again, as others advise, the quinine may be administered during the decline of the fever. The fever we believe to be coincident with the setting free of the parasite in the blood. The young organisms very quickly attach themselves to the red cells which they seek to penetrate. If quinine is given at this time, its rapid absorption, as just expressed, brings it into contact with them and effects their destruction.

Still others advise dividing the daily dose, administering a portion, three times a day, every four hours or every six hours. As we have seen, only half the dose ingested is excreted in six hours, so this procedure keeps the blood cinchonized continuously. This method has advantages where the time of the paroxysm is more difficult to determine, as in the remittent or continuous forms, in quotidian infection and in the pernicious types.

So one may administer the dose (1) a few hours before an expected paroxysm; (2) at the decline of the fever of a paroxysm; or (3) divide the dose throughout the twenty-four hours.

The object is to have enough quinine in the blood to kill the organism when it is free.

Preparations.—There are numerous salts of this alkaloid, representing varying weights of the alkaloid and varying solubility. Most of the salts are sparingly soluble; a few freely. Of these the sulphate (basic) which contains about 75 per cent. of the alkaloid (74.31 per cent.) is the one most commonly used when the drug is administered by the mouth. The more soluble acid hydrochlorate, or bisulphate, or bimuriate of quinine and urea is used for hypodermic purposes.

The sulphate is practically insoluble in water (1 in 800), and is usually administered in capsules or wafers. Pills and tablets are likely to be hard or tough and in this way the drug escapes absorption. The 2 grain quinine capsule is the favorite unit. There is no question that this drug were better given in solution and, indeed, where the condition of the stomach leads to a suspicion of its impairment and hydrochloric acid may not be secreted, the solution should be used. The drug is freely soluble in any dilute acid, hydrochloric, sulphuric, phosphoric or tartaric. A minim per grain is enough. The objection to this method is the intensely bitter taste. Effort may be made to disguise it. One way is to dissolve the dose in a few grains of citric acid (gr. x.), in a little lemon juice, add to it water in which a pinch of bicarbonate of soda has been dissolved and take while effervescing.

Dosage.—In the tertian or quartan fever of a non-pernicious type, the daily dose to begin with should be gr. xv. to gr. xx. In the estivo-autumnal form gr. xxx.

Mode of Administration.—In the first mentioned forms I prefer to give, if seen before the paroxysm, gr. xv. of the sulphate; if seen during the decline of the fever, the same dose. From that time on giving gr. xx. divided into four doses in the twenty-four hours (the dose at the decline of the fever forming a part of it), until the succeeding paroxysm is aborted, then diminishing the dose gr. ii. every two days until the dose is reduced to gr. vi. a day for three or four weeks.

In the estivo-autumnal forms give the larger dose gr. xxx. to begin with, and after aborting the paroxysms, reduce to gr. xx. or gr. xvii. and proceed in the same way as above.

Pernicious Infections.—As I have said the pernicious type of the disease is rarely seen in the North; in the South and in the tropics, however, it is much more common. It may be caused by the tertian, quartan or estivo-autumnal forms of the parasite, but much more commonly by the last.

The fever is usually irregularly remittent or constant.

The profound intoxications are seen more commonly in those who have had repeated attacks or in neglected cases, and in those in whom resistance has been lowered from one cause or another.

Profound depression of all the vital centres is seen, and a particular imposition of the poison on one or the other organ gives a stamp to the picture and affords abundant cause for error in diagnosis.

Thus we have a comatose form in which sudden loss of consciousness resembles apoplexy; apathetic conditions with icterus, like yellow fever; diarrheas that resemble cholera or dysentery; and not infrequently an attack characterized by profound prostration, collapse, excessive sweating, sometimes subnormal temperature, the algid form.

In these cases quinine must be used hypodermically or intravenously according to the urgency.

The best salt for hypodermic use is the acid hydrochlorate, which dissolves in less than its own weight in water. Make up a solution as follows:—

Hydrochlorate of quinine.....5 grm.
Distilled water.....10 c. cm.

Use 15 minims as a dose, which will contain gr. 7½.

The amount needed in the twenty-four hours is some 24 grains given in divided doses in this way.

In these severe but less urgent forms, if given by the mouth, the amount should run up to 30 or 40 grains a day.

One should take every precaution to be assured of a sterile needle, syringe and skin, and should inject into the gluteal region or muscles of

the back and go down deep into the muscle. There is likely to be some pain and induration. Another preparation of quinine which is excellent for hypodermic use and freely soluble is the bimuriate of quinine and urea, to be used in the same dose.

In most urgent cases, it may be deemed advisable to put the drug into a vein. This may be done in physiological salt solution. For example:—

Hydrochlorate of quinine	1 grm.
Sodium chloride	0.075 grm.
Water	10. c. cm.

Inject all at once into the basilic vein made prominent by a ligature above. Other veins, if more accessible, may be chosen.

A word more about quinine before we proceed with out subject. This drug is an antipyretic and used as such under certain circumstances. Its antipyretic action is apparently due to the depression of function of protoplasm, of which mention has been made. Some effect, too, upon ferment action can be determined. The result is a lessened output of heat from the tissues, through direct action and not through the intermediation of the heat regulating nervous mechanism. It must be remembered, however, that in malaria the control of temperature is to be attributed entirely to the destruction of the plasmodium and not at all to this pharmacological action.

Of more importance to us are those toxic symptoms that may occur when inordinate doses of the drug are given, and so can be avoided; and which occur after very small doses in certain people, whose reaction to the drug constitute an abnormality which we call an idiosyncrasy, and cannot be avoided. Idiosyncrasy is one of those philological accomplishments, sent as an advance agent to occupy a territory until knowledge shall advance. It is the shadow rather than the substance of a thing, but like many other shadows in affairs temporal it is allowed to usurp and continue to rule as the real thing. It is derived from two Greek words, ιζιος, own, and συγρασις, mixture,—having its own mixture, that is a quality peculiar to the individual. What that quality is and how it operates is left for the future to elucidate.

These toxic symptoms are called "cinchonism."

The earliest and most common are ringing or roaring in the ears and a mild degree of deafness. If it amounts to no more than this we give it no consideration, but this may go on to complete deafness.

This has been attributed to congestion and hemorrhages in the tympanum, but Cushny believes, in the light of recent research, that this view is not correct, but that the phenomena are attributable to degenerative changes occurring in the spiral ganglion in the cochlea.

Less frequently than the hearing, the vision is affected. The field of vision is contracted, the color vision disturbed, and blindness may ensue.

The visible changes in the eye are contraction and even obliteration of the retinal vessels, sometimes degenerative changes in the retinal nerve-cells and even atrophy of the optic nerve.

Skin eruptions occur in great variety. The most common is an erythema that has been mistaken for scarlatina, an illusion heightened by the fact that it may desquamate; next to that, urticarial wheals. Hemorrhagic rashes also occur, which on occasion may give rise to the diagnosis of a septic process. Less commonly, the drug may cause gastric discomfort of a marked degree and is believed at times to cause hemorrhage from the kidneys. In a case of malaria this may give rise to the diagnosis of black water fever and, indeed, Koch maintains that black water fever is due to quinine. I think that the better judgment attributes hematuria to quinine but very rarely, but believes that it is certainly indicated in black water fever.

When idiosyncrasies do exist to a marked degree they constitute contraindications to the use of the drug.

A further contraindication is any inflammatory process in the middle ear or labyrinth.

In the pernicious form indications must be met as they arise. For collapse, stimulation with strychnine or caffeine is required, and in the more urgent cases more rapidly acting agents should be used, such as camphor, adrenalin or ammonia inhalations.

In the algid form the body heat must be maintained by hot drinks containing coffee, brandy or whisky; by blankets and hot bottles or bricks about the body and the hot-water bag at the feet; and by hot rectal injections containing coffee.

In the choleraic form the same line of treatment with hypodermoclysis or venous infusion of warm salt solution.

Morphine is to be injected to control the peristalsis.

For extreme nervousness morphine is the best, because the least depressing and most effectual of the sedatives.

After the severe infections there are certain sequelæ that are possibilities that must be taken into consideration.

The first of these are the mental disturbances, delusional insanity, mania and most common of all melancholia.

Sharp watch must be kept of these exhausted subjects to appreciate any mental aberration, any depression presaging melancholia, with its self-destructive impulses.

Kidney complications occur. Albuminuria is frequent during the attacks, in some 30 per cent. of the tertian and quartan, and 50 per cent. of the estivo-autumnal. This must not be taken too seriously, as real nephritis rarely ensues in the milder forms of the disease. Taking the estivo-autumnal form and the severe infections it induces in the tropics, nephritis, as a sequel, will amount to nearly 3 per cent. and is usually of the chronic parenchymatous variety.

These conditions are to be treated in the same way as if arising from any other cause.

Large liver and large spleen may persist without symptoms of any kind attributable to any interference with their functions.

Anemia, as the result of the blood destruction, is an inevitable result of malaria. After the tertian and quartan infections, the repair of the blood is rapid; after the estivo-autumnal form less so. Good food, air, change of surroundings, iron and arsenic all help recovery.

There are, however, cases in which repeated attacks have occurred, where the treatment has been neglected or been insufficient, and where a chronic poisoning is set up that is termed malarial cachexia. These patients show but few organisms in the blood. These are usually the estivo-autumnal form, and are not easy of demonstration. The patients are markedly anemic, with the type of secondary anemia; are emaciated, nervous and constantly fatigued, and have a poor appetite and readily get short of breath. Next to the anemia the enormous size of the spleen is the most notable clinical manifestation.

These cases should be removed from the malarious district in which they reside, to one free from infection: to the mountains or to a suitable seashore resort. If this cannot be done, attempts must be made to protect the patient from further infection, that is, the bites of mosquitoes, by choosing an upper room, screening the room, and taking special care to avoid exposure toward nightfall.

Quinine should be begun at once. Doses of gr. iv. may be given three times a day, or in more severe cases up to gr. xvi or gr. xx a day until the slight afternoon rise of temperature that usually accompanies the infection subsides. Then the dose of gr. iv three times a day may be cut down to gr. iii. and gr. ii. three times a day and continued in these doses for weeks.

Iron and arsenic are of great help in these cases to improve the blood state.

Iron may be given in the shape of a carbonate of iron or other iron preparation. I prefer the carbonate, *e. g.*, pillula ferri carbonatis (Blaud's) gr. v., one three times a day.

Arsenic may be given as Fowler's solution, liquor potassi arsenitis, m. iii., three times a day, increasing m. i. each day up to m. viii. or x. three times a day or to the point of some manifestation of intolerance, as suffusion of the eyes, puffiness under the eyes or gastric disturbance.

Iron and arsenic may be combined in pill form, *e. g.*:

℞ Massæ ferri carbonatis (Vallet's mass) . . . . 10.00 grm.
Acidi arsenosi. . . . . 0.05 grm.

Massa fiat in pilulos numero xxx. dividenda. S. one three times a day.

This gives us gr. v. of the mass of carbonate of iron and gr. 1/40 of the arsenious acid at a dose.

The nervous manifestations may be helped by strychnine in doses of gr. 1/40 to gr. 1/30 three times a day, taken with the iron and arsenic; and, indeed, they may all be incorporated in one pill or capsule. One should always know that the pills ordered are fresh.

Plenty of fresh air and sunshine are even more important than drugs. Good food and plenty of it to make good the extensive tissue destruction; cool baths, showers, light massage and exercise; at first by walking, later, as the patient's strength returns, by golfing and horse-back riding, and at the shore by swimming complete the treatment.

What is to be done if the patient cannot take quinine?

I hesitate to offer any substitute because there is no other that is even remotely comparable to quinine and the "cannot" is often a prejudice on the part of the patient, or a result of ignorant usage, as colossal dosage, insoluble pills, and nauseous mixture. Again the little disturbances of hearing are interpreted too seriously and further effort to continue the drug is given up. Idiosyncrasies of serious import are very rare.

It is a detriment both to the physician and patient to convey the idea that anything else is nearly as good, or is a fair substitute.

Mythylene-blue has been advocated as such. It is a very poor substitute. If, however, we are actually debarred from using quinine, then we may try it in doses of gr. viiss. to gr. xv., a day, divided into three or four portions.

One should remember to warn the patient that the drug will lend color to the urine, a rather startling phenomenon to a patient who is not informed, and that strangury or diarrhea, intervening in the course of treatment, may be due to the drug.

Prophylaxis.—We are so well informed now as to the sequence of events in malarial infection, as to the rôle of the mosquito, the individual and the malarial organism, that our prophylaxis is clearly defined in measures aimed at the three links in this chain.

The mosquito like Carthage "delenda est" and medical Catos has arisen to reiterate the slogan.

Mosquitoes breed in marshes, ponds, pools or any receptacle of quiet water, even cisterns, buckets or tin-cans.

Where municipalities have become sufficiently interested or in certain territories under control of the Federal government, vast stretches of marshes have been drained for the extermination of the mosquito or, in smaller areas, water-containing depressions have been filled in.

Where communities are ignorant and careless, brigades of mosquito exterminators have been formed, whose business it is to see that cisterns and water receptacles are screened, that small pools are filled, rubbish-containing water disposed of or a thin layer of kerosene poured on the surface.

Kerosene is the most effectual substance used to exterminate the mosquito over extensive surfaces of water. The larvæ of the mosquito

have to come to the surface of the water to breathe. The oil prevents their access to the air and fills their air-channels.

Education in schools, public lectures, disseminated literature, explaining to individuals how proper methods may be used in their own environment, is one of the prophylactic measures of the highest import, for through this means both personal and civic responsibility is cultivated.

Numerous odorous substances have been used to kill the mosquito in a closed space, the best of these is pyrethrum or pellitory, which contains an acrid resinous-like substance, which when the powder is burned, gives fumes very fatal to them.

If the mosquito cannot be destroyed, the individual may be kept from their attack. This has a double significance. It prevents the man from becoming infected, or being infected, from infecting the mosquito to pass it on to another man.

Isolation may be effected by the use of screens in windows and doors, by choosing a room in the upper stories for a sleeping room. If the individual lives in a badly infected district, he should avoid going out after sunset or before sunrise unless his head is protected by a veil worn over the hat, his hands by gloves and his ankles by boots. In the tropical forests such precautions are necessary even by day.

Applications, such as oil of pennyroyal, oil of eucalyptus, camphor, citronella, may be made to the skin, the odor of which will keep the insects away.

℞ Oil of pennyroyal. . . . . .
Oil of citronella. . . . . .aa. 1 ounce
Alcohol up to. . . . . .8 ounces
Mix and apply locally.

Going into malarious districts, at the season of the year when infection occurs, or if living in malarious districts, prophylactic doses of quinine should be taken: gr. ii. three times a day or slightly larger doses, gr. vii. to x. two or three times a week.

Finally, as the infection may die out of itself in certain instances, we know that the body has the power of elaborating protective substances, so that it may repel lesser infections and mitigate severe ones. To do this the body must otherwise be in good health and all measures aimed at excellent physical condition should be considered for those living in exposed districts.

Alcohol does harm and it should not be used in the tropics at all. Arctic explorers tell us it should not be used in the North, so, it would seem that the temperate zone would have a hard battle to justify its designation.

Finally, the malarial organism is attacked in the body of the man, by the use of quinine, before it has had time to multiply and give rise to the characteristics of the disease.

THE DIFFERENTIAL DIAGNOSIS AND TREATMENT OF SOME OF THE COMMON DISEASES OF THE UPPER ABDOMINAL QUADRANT.

By W. W. Grant, M. D., of Denver.

It is manifest that not only in private practice, but in the teaching and curriculum of the schools, there is a serious lack of systematic study of disease at the bedside, and appreciation of the great value and importance of clinical instruction, as well as of analysis and rational interpretation of symptoms.

But some schools are waking up to the importance of bedside diagnosis. Let us hope that the early future will demonstrate this growing interest in a most important department of our study and work in this brilliant period of evolution in pathology and bacteriology, and of great surgical accomplishments and commendable progress in neurology. Yet it is true, as regards diagnostic achievement, the growth has been slow and the pace lame and halting in comparison, while the great internists, skilled in diagnosis, few and far between, have had a big field to themselves.

In no department of medicine and surgery, and especially the latter, has such great interest and activity been shown as in the subject under consideration; and in no department are mistaken diagnoses more common. In no department is an early, accurate diagnosis of greater importance. It is the special opportunity of the general practitioner to display both interest and skill, and to render the greatest possible service to the medical art, and substantial contributions to the triumphs of surgery. For I think it will be conceded that in no department is credulous nature more imposed upon, and in none are diagnostic errors and delays more fatal.

We approach this subject, therefore, in the confident belief that it will appeal to the conscience and interest of our profession. I believe the conviction is justified that where one physician makes a painstaking, intelligent examination of a case, though it may not be wholly scientific, but commendable, there will be a dozen who will make an indifferent and careless one, reaching perhaps a prompt diagnosis, and too frequently an erroneous one. We seem not to appreciate important clinical facts in the investigation of disease. In the analysis, meaning and interpretation of symptoms, we do not take our work seriously. Consequently, scientific medicine, in its true and broad sense, is promoted by the few, recognized by the many, and valued less by most than it deserves to be. Careless

methods, false logic and unjustifiable deductions are the too frequent result.

In medical college work, we are moving with commendable spirit and energy to a higher plane of teaching. Weak and unnecessary schools are being elimited; the better consolidated, thus giving better advantages, and exalting the standard of medical education; and, by so doing, meeting the highest hopes of the profession, and the just demands of public opinion, enlightened by the scientific and humane work of our profession.

Yet the curriculum of the schools is still defective and especially so in all that pertains to preventive medicine and the public health. How *much* is taught about pure foods, pure water, hygiene, sanitation and allied subjects, which effect the individual organisms and anaphylaxis, or susceptibility to disease.

The latter is now believed to have its origin in the intestinal tract. No physician or surgeon can lay any claim to being an accurate diagnostician as to the diseases of the upper abdominal cavity, without an intelligent basic knowledge, not alone of the organs under normal conditions, but also as influenced by diet, drink, occupation, habits, environment, and many other things which influence local as well as general health, and have a distinct influence in the production of immunity, as well as increased susceptibility to disease in a particular organ or part. As it is known that hydrochloric acid is secreted only in a certain part of the stomach, we may the more reasonably interpret the significance of its presence in some stomach cancers, its absence in most, and its increase in ulcer of the stomach. The diseases of the lower abdomen are better understood and treated, while in the upper quadrant both knowledge and treatment are far more empirical.

It is impossible to discuss the important facts and differential diagnosis of diseases of the upper abdomen without allusion to the appendix, for the simple reason that, even now, it bears the burden of almost every doubt cast upon the stomach, the duodenum and the gall-bladder. The voluminous literature, with the still unnecessary mortality, too plainly carries with it the charge of erroneous, late diagnoses and delayed operations. The story runs something after this fashion: The patient complains and gives a history of indigestion. He is, of course, "bilious," and if he has occassional rather severe attacks, lasting a few hours or a day, with or without nausea or vomiting, he may be lucky, or unlucky, if he escapes the charge of "acute indigestion," due to "error in diet"; or with some surgeons and physicians, a mystery of doubt and uncertainty befogs his conclusions, but appendicitis produces such a history, and an immediate interval operation is advised. It is needless to say that the pathological findings may be, and sometimes are, as uncertain and negative as was the clinical history of appendicitis. We may, with propriety, paraphrase the statement of Kelly, as to the disease, "that no patient is killed by an

early operation, but many die for want of one," as a general declaration applicable to many diseases, and especially to those under consideration, that no patient dies from an early diagnosis, but many die for want of one.

Stomach and duodenal ulcers are common diseases, and the proportion of the duodenal to the stomach ulcer is much greater than was believed only a few years ago. Infective cholecystitis is even more common, and its frequent association as a cause of cholelithiasis and chronic or subacute pancreatitis, is acknowledged. The causative relation of gall-stones to cancer of the gall-bladder is established, while primary cancer of the liver is uncommon. All these diseased states are attended with marked and presistent symptoms of indigestion. It cannot be too strongly impressed that these symptoms of positive, chronic indigestion have a basis in organic disease, and until we seek and find pathological reasons for the application of drugs and surgical procedures, we cannot hope to make satisfactory progress in the scientific treatment of disease.

In this connection, it is proper to mention the association, or connection of certain disturbances of the female adnexa in creating disturbance of the stomach. A typical and instructive illustration is the following: A maiden lady of thirty-five, a music teacher, for three years has complained of frequent, severe pain of stomach, occasional slight nausea, constant epigastric tenderness. Was told by one physician that she had chronic appendicitis, by another stomach ulcer; and gastro-enterostomy was advised. In a recent examination, I found not the slightest indication or history of appendicitis, no gall-bladder history, and no satisfactory evidence of stomach ulcer. Inquiry elicited the information that menstruation was normal as to frequency and quantity. Three years before she had a fall, and stomach disorder dated from that time. In an examination per vaginum, I found complete retroverted uterus with probable descent of an ovary. Pressure on the uterus per Douglas pouch in lifting it, caused immediate aggravation of the stomach symptoms. Replacement by intraperitoneal shortening of the round ligaments gave complete and prompt relief. These displacements are common, and frequently give not only no local discomfort, as in this case, but no reflex or sympathetic disturbance of distant organs.

Ulcer of the stomach presents certain distinct and rather constant symptoms: pain and tenderness of the epigastrium, hemorrhage by vomiting within an hour or two after eating. The pain is relieved by eating, and the hyperacidity and irritation due to it, by alkalies. The hemorrhage is not, as a rule, severe, but its frequency produces anemia. Severe hemorrhage is not common and does not often occur; but it may occur in acute ulcer, or in the course of chronic ulceration. The severe hemorrhage in acute ulcer comes on without premonition or previous history of indigestion, but is always followed by the latter. Hemorrhage is the first conclusive symptom, or evidence, of gastric ulcer. Only within the last few years has anything been known of duodenal ulceration. The better

it is understood, the more common it is known to be. While it is generally believed that the symptoms and history of gastric ulcer and duodenal ulcer are practically the same, yet they are in fact quite different. Hematemesis in gastric ulcer occurs soon after eating; in duodenal ulcer six or eight hours after eating. Occasionally, when ulcer is very near to pylorus, hematemesis occurs in this form of ulcer. It is less likely to result in cancer and is more amenable to surgical treatment than is ulcer of the stomach.

In reviewing for a Chicago journal the very recent work by Moynihan,* the writer noticed a strong insistence upon a distinct periodicity in the course of duodenal ulcer, a subsidence of all symptoms for several months at a time, and especially a recurrence with cold weather. There is no such periodicity or relation to the seasons in gastric ulcer. The tenderness is much the same in both. The epigastrium is the chief seat. It radiates to the left in gastric ulcer and to the right and under the shoulder blade in the duodenal.

He says there is no foundation for the "venerable fallacy," that dyspeptic symptoms are due to excessive acidity of the gastric juice, and that in all cases of hyperchlorhydria operated on by him he has found always duodenal ulcer, but less free hydrochloric acid after a test-meal.

He makes the very interesting and significant statement that "to-day it can be truthfully claimed that any first class internist or surgeon should be able to make a diagnosis on the clinical symptoms and history alone, without resort to the laboratory for the detection of blood in the feces, or reliance upon physical signs."

Dilatation of the stomach is common in duodenal ulcer, and especially so when stenosis of the plyorus occurs in chronic ulcer. Dilatation is uncommon in gastric ulcer.

Infective cholecystitis is common, and with the inspissated gall-bladder mucus, is the condition which precedes cholelithiasis. Infection is a frequent sequel of typhoid fever, and consequently the Eberth and colon bacilli are the usual bacteria found. Gall-stones do not necessarily produce pain or severe colic. When arrested in the cystic or common duct, the pain is so severe and spasmodic as to leave no doubt as to its source. Obstruction of the cystic duct does not, as a rule, produce jaundice. Obstruction of the common duct, if complete, does. A stone may be fixed in this duct and yet be sufficiently movable to permit the escape of bile. This was demonstrated years ago by the late Christian Fenger. Inflammatory thickening, due to what is called catarrh of the ducts, may produce temporary cholemia or jaundice. The same class of digestive symptoms exists as in duodenal ulcer and in many cases of appendicitis, but a careful study of the natural and clinical history of each case will, as a rule, leave little doubt as to the diagnosis. It should be stated that cholecystitis and appendicitis not infrequently coexist, and

*Duodenal Ulcer. Philadelphia and London: W. B. Saunders Co., 1910.

many errors are related as to the diagnosis in these diseases respectively.

Chronic interstitial pancreatitis is common, and is usually an infective sequel to gall-bladder disease.

As long as the Islands of Langerhans are in healthy action, glycosuria will not result, so urinary examination is necessary in the determination of the questions involved in disease of the pancreas. Fatty diarrhea should also be noted and the Camnidge test applied to urine, though it is not reliable.

Acute hemorrhagic pancreatitis is indicated by severe epigastric pain radiating to the left, vomiting, subnormal temperature, tumor, and symptoms of peritonitis and ileus. It is rapidly fatal without operation, and the diagnosis must be made with little delay, or an exploratory operation made, which usually determines the diagnosis, and saves those who recover. Hypertrophy and sclerosis of the head of the pancreas, due to chronic interstitial inflammation, has not infrequently been mistaken for cancer, but the error was not discovered until drainage of the gall-bladder cured both.

The intimate anatomical and physiological association readily explains the common pathological relation of the gall-bladder, ducts, duodenum and pancreas. The subjects of cholelithiasis seem to be, as a rule, rather fat than lean, rather lymphatic than sanguine. The tissues are rather softer than normal, and even in the absence of jaundice there is a yellowish tinge, or muddy coloring, of the conjuctiva and skin. If there is tenderness, it is beneath the ninth costal arch. Subdiaphragmatic abscess is the result of perforation of a post-cecal appendicitis, of the gall-bladder, or perforation from stomach or duodenal ulcer. The subject should not be concluded without mention of the marked digestive symptoms observed in a certain class of cases that are said to suffer from nervous dyspepsia. These are usually anemic, neurotic women, and it should be needless to assert that gastro-enterostomy is positively harmful in these cases.

The increasing prevalence of cancer is fully recognized. The excessive mortality is an established fact. The stomach is affected more frequently than any other organ. Mayo Robson, Moynihan and W. J. Mayo state that over 70 per cent. of stomach cancers are *preceded* by *evidence* of chronic gastric ulcer. The latter is more common in women; while duodenal ulcer is more frequent in men, not infrequently involving the pylorus. The age of the patient, the history of the ulcer, loss of flesh and absence or great diminution of free hydrochloric acid, and increase of lactic acid evidenced by test meals are strongly suspicious of cancer.

Treatment.

The treatment is both medical and surgical. I know of no class of patients with such credulous imaginations, whoare such a burden to themselves and who so thoroughly test the patience, the skill and the

ingenuity of the medical attendant as those neurotic individuals who believe they have serious organic disease. They have stomach manifestations; appendectomy and gastro-enterostomy have frequently been performed in such cases; and it is, perhaps, needless to say with disappointing results. Even when organic lesions require it, the beneficent results are generally late in their manifestations. Rest, suitable diet, habits, environment, etc., are especially necessary to their successful and satisfactory treatment.

It is to be hoped that the day of treating *symptoms* is rapidly passing. When in doubt *as to what is the* matter, the treatment, medical or surgical, is purely empirical. When no serious painstaking effort is made to solve the doubt, treatment must continue unsatisfactory as well as unscientific.

The acute stomach ulcer, even though attended with free hematemesis, is best treated medically. Operation is seldom required, for the hemorrhage ceases about as suddenly as it comes on, and does not often recur. Yet, the ulcer is the foundation and beginning of the chronic ulcer which does require operation, preferably by gastro-intestinal anastomosis,—the posterior no-loop operation is the best,—and cures most cases with no operation as to the ulcer itself. Curling's ulcer following burns is acute and more apt than others to perforate and require immediate operation.

In some cases of circumscribed ulcer with hard base, the ulcer should be excised, or the Rodman or Finney operation done. For the subacute or chronic ulcer of the stomach and duodenum, these are the measures of choice, in the order mentioned. No modern operation has given better and more lasting results. Its use should be confined to these conditions and to pyloric stenosis.

A gall-bladder, once infected, with or without stones, is always infected, until cured by operation and drainage. The same operation cures the cholemia and pancreatitis which exist in consequence of infection of the gall-bladder.

W. J. Mayo has stated that with an open pylorus, the artificial opening in gastro-enterostomy will eventually close. Moynihan enters a positive denial, and further says that when the stoma does close, the operative technique was defective and the opening too small, necessitating, occasionally, a second operation. With the posterior no-loop operation, the vicious circle does not occur.

In cancer, the operation, of course, is different and more elaborate. The primary operation for duodenal and stomach ulcers is not only curative, but distinctly prophylactic as to cancer, which should emphasize the great importance of a timely, correct diagnosis.

Moynihan is emphatic in condemnation of the too common habit of treating dyspepsia as a disease, instead of as an expression of organic disease. To treat functions instead of organs is not rational. In this con-

nection, the very recent investigations of Crile on the pathological cytology of anemia, surgical shock, infections and Graves's disease are most interesting, and I believe pertinent to the occasion.* It is an accepted doctrine that there is a correlation between clinical phenomena and morphological changes. These demonstrations are now extended to the brain, and Crile shows that even "in shock there are *corresponding degrees* of *changes* in the *structure* of the *nerve cells* in all parts of the brain." When there is grossly altered function, there is a definite morphological change in the brain-cells. This applies to all organs and functions. There is but one logical conclusion, and that is, there is no such thing as functional disease; that all disease is necessarily organic, and that to treat functional manifestations and symptoms as anything but an *expression* of organic action is irrational and unscientific. It is hardly necessary, I think, to resort to a priori conceptions to show the fallacy of treating dyspepsia, and a host of other symptomatic expressions as disease.

These suggestions are not speculative, but based upon facts which ought to appeal as strongly to the medical mind, as the correlation and conservation of force, or the mechanical equivalent of heat does to the scientist.

My endeavor is to show, if possible, that we have depended too much upon the laboratory, upon instruments of some scientific precision, and too little upon our own faculties, knowledge, and observation of disease to advance the cause and necessity of better diagnostic knowledge on the part of the general profession. We have surrendered our opportunities and individual resources to the genius, or exceptional accomplishments, of a few men, in and out of the laboratory. The result has been a depreciation of the masses, especially in diagnostic skill, both medical and surgical. Erroneous, or delayed, diagnoses are the too common sequelæ, with its unfortunate consequences.

A certain measure of imitation may be pardoned, but at best it is never a constructive force; and for the general tone and knowledge of the profession to advance to a higher plane, it is necessary that there should be greater individual effort and accomplishment in the clinical study of disease.

As an aid in certain necessary conditions, and in the solution of doubtful problems, no well-informed man can doubt the value of the laboratory, since there is no brighter page in the history of modern medicine than that written by bacteriologists and pathologists.

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SOME UNEXPECTED EXPERIENCES IN LOBAR PNEUMONIA.

By Charles G. Stockton, M. D., of Buffalo.

The pneumococcus is notorious for its ubiquity. It is variable in its morphological characteristics and inconstant in the results which follow its introduction into the organism. We find that it may multiply in the upper air-passages for an indefinite period, apparently without serious results, but occasionally produces a violent reaction in these parts. It may thrive for a long time in the urinary tract, producing no more serious effects than an irritable bladder; on the other hand, it may produce great local and systemic disturbance. A common cause of simple, acute pleurisy, it develops in a proportion of cases local or widespread empyema or abscesses of the lung. It is occasionally found in the fluid of the joints, apparently the cause of acute arthritis. Endocarditis, pericarditis, meningitis and peritonitis are at times the local expression of an infection by pneumococcus. The involvement of the accessory sinuses of the head and inflammation of the mastoid are recognized as being amongst the more common results of infection by this organism.

We are accustomed to consider lobar pneumonia as the expression of a pneumococcus infection of the lungs. When this subject is analyzed, it will appear that lobar pneumonia is something more than a simple pneumococcus infection of the lungs. For instance, many cases of bronchitis depend on a pneumococcus, and broncho-pneumonia that follows a long and irregular course may depend upon the same cause. Very frequently we find that the serous covering of the lung is involved while the parenchyma of the organ escapes. Now, lobar pneumonia is something different from pleurisy, from bronchitis and from broncho-pneumonia, and the question may well arise, why is it that this organism in a proportion of cases displays its activity with a sudden onset, a rapid course, terminating generally in a crisis with very characteristic pulmonic lesions, accompanied by very characteristic systemic disturbances? Most of us will admit that pneumonia in some way or other is dependent upon pneumococcus. But at the same time it must be conceded that the same organism is competent to produce any one of several diseases of the respiratory tract, and each of these several diseases has its peculiar syndrome, which enables us to speak of these several affections as different clinical entities. Furthermore, when we analyze critically our cases of true lobar pneumonia, we find that we are dealing with a disease having very protean tendencies.

It seems to me that a useful subject for discussion would be to in-

troduce a consideration of the numerous peculiarities exhibited by this disease, as one encounters it in ordinary hospital practice.

To begin with, let me cite the following case:—

Case 1.—Typical lobar pneumonia; marked leucopenia without grave depression; rise of blood count with defervescence.

An Italian, twenty-one years old, who had previously enjoyed good health, and who was attacked by pneumonia, with the usual onset three days before entered the Buffalo General Hospital, February 17th, 1910. At this time he was found to have a temperature of 105° F., a pulse of 108, respirations 30. He had the characteristic facial appearance of lobar pneumonia, including herpes, and on physical examination it was discovered that he had consolidation of the lower half of the right lung, with the usual signs. As a routine matter, the blood count was taken when, to our surprise, it was found that the white cells numbered only 2,200. This remarkable leucopenia led us to suspect that the house physician making the blood examination had fallen into error. Therefore, Dr. Karl F. Eschelman (to whom I am indebted for this and other observations described in this paper), counted the blood and found 2,100 white cells. It was a recognized fact that in grave cases of lobar pneumonia, there is an absence of leucocytosis, and, occasionally, as the vitality of the patient falls to a low ebb, we may find a leucopenia, but never in my experience have I seen lobar pneumonia in a patient apparently doing well, on the third day of the disease, with a leucocyte count so low as this. The natural inference was that the patient was suffering from typhoid fever, and that we had a typhoid pneumonia rather than one of pneumococcus infection. A Widal reaction, however, was not present. The patient in other respects, ran an uneventful course and on the fourth day of the disease, his blood count rose to 2,500. On the sixth day it was 4,800, and resolution was beginning. On the eleventh day, resolution was complete and the patient had a white count of 7,700. He made a perfect recovery and was discharged cured.

Possibly some of you have had a similar experience and, should it be so, it would be interesting to learn your interpretation of the blood changes.

Case 2.—Typical lobar pneumonia and convalescence. Three weeks later returned with hyperemia of the lung, fever and serious pharyngitis; abscess, pure pneumococcus culture.

On January 5th, Mrs. K. H., aged twenty-five, entered the hospital with typical lobar pneumonia, which ran an uneventful course in spite of the fact that she suffered from an old mitral valvular disease. She was discharged as well on the 25th, three weeks after entrance. On the 28th, three days subsequently, she returned complaining of pain over her lower left chest, the area formerly involved in pneumonia. There were physical signs of hyperemia of the part, nothing more; the patient had a moderate dyspnea, accompanied by what seemed to be pleuritic

pain. There was a leucocytosis of about 16,000. What most attracted our attention was a violent pharyngitis. The temperature ranged between 103° and 104° F., the pulse was 120, respirations 32; the blood-pressure between 95 and 100. The peritonsillar tissues, posterior to the glands, became edematous, were incised, and there was discharged a bloody serum which contained a pure culture of the pneumococcus. The attack ended by crisis about five days after the beginning of illness, after which there was an uneventful recovery. This case was interesting to me because of the synchronous appearance of congestion in the lung and pleura (which had been involved three weeks before in lobar pneumonia), and the appearance of the unusual pharynigitis which appeared to depend upon the pneumococcus. The question arises, was this a slight recurrence of lobar pneumonia? In this connection it should be noted that the patient had been ten days free from temperature previous to this second illness. What should be the interpretation of the pharyngitis? Is it possible that through the involvement of the throat her immunity was raised so that a relapsing pneumonia was cut short? It is interesting to know that a pharyngitis and tonsillitis may depend upon infection by the pneumococcus.

Case 3.—Pneumonia; acute arthritis; pneumococcus and staphylococcus recovered from blood. Staphylococcus vaccine. Recovery.

T. H., aged forty-five, entered the Buffalo General Hospital on January 28th with typical lobar pneumonia, involving the base of the right lung, having a temperature of 104° F., pulse 110, respirations 40. The course of the disease was uneventful so far as the pneumonia was concerned, but on the third day after his entrance, about the fifth day of the disease, he developed arthritis, involving the hands, feet, knees and slightly the shoulders and hips. The fever declined by lysis. Eight days after admission the temperature was 98.4° F. and remained practically normal thereafter. The arthritis, however, continued. A blood-culture revealed the presence of staphylococcus albus and pneumococcus. The patient was treated by staphylococcus vaccine with salicylates for the relief of pain. There was gradual improvement of the arthritis and the patient was discharged cured a month later. In this case we had, besides pneumonia, a mixed septicemia depending upon pneumococcus and staphylococcus with a general arthritis which in its symptomology did not differ from that of ordinary rheumatism save that it was accompanied by less fever. The leucocyte count was never above 16,000, and after the subsidence of the pneumonia, not above 12,000. In this case we expected to encounter a septic endocarditis, but we were disappointed. We were unable to procure fluid from the joint for culture, and we remained in doubt as to whether the arthritis depended upon pneumococcus or staphylococcus, upon both these or, possibly upon an intercurrent rheumatism, the result of some unknown organism. I am not prepared to state how much the vaccine had to do with the man's improvement. If we had not

made the blood culture, the case undoubtedly would have passed for rheumatism without further question.

Case 4.—Chronic valvular disease of the heart; lost compensation; acute arthritis; lobar pneumonia; septicemia; septic endocarditis; pericarditis; hemiplegia. This case illustrates an extraordinary array of pathology.

W. C., aged fifty, entered the Buffalo General Hospital February 9th. He had been discharged from the institution three months previously, somewhat improved from a grave disability dependent upon broken compensation, the result of chronic valvular disease of the heart. On his second entrance he was complaining of arthritis, the knees, ankles and wrists being involved, especially the right knee. This was treated according to the method devised by Dr. John B. Murphy, of Chicago, that is, the joint was aspirated, 8 c.c. of thick viscid fluid being removed, and without withdrawing the needle there was introduced 1 c.c. of a 2 per cent. solution of formalin in glycerin. Buck's extension was then applied. The patient was immediately relieved and the joint appeared well within thirty-six hours. A culture attempted from the fluid showed no growth. On March 8th, the rheumatism had practically disappeared and the man was regaining compensation of his heart. Then his temperature rose to 104, respirations at 40, and upon physical examination there was revealed a consolidation of the greater portion of the left lung. He developed a leucocyte count of 26,100, and the sputum showed the presence of many pneumococci, a moderate number of streptococci and many staphylococci, besides bacilli. On the third day of his illness, a blood-culture was taken from which grew an unidentified bacillus which was Gram negative and non-motile. Widal reaction was negative. A second blood-culture showed a definite pneumococcus growing abundantly. Soon after the patient developed an acute endocarditis and pericarditis, exhibiting remarkable variations in temperature and pulse. The temperature showed sudden excursions from 104 to 94° F. The pulse varied from 40 to 120. After a fortnight, the pneumonia having disappeared, and the heart condition showing improvement, the patient developed left hemiplegia, apparently from embolus. Four days preceding the hemiplegia, the leucocyte count had risen to 47,600. Following this the patient made some improvement and there were no other manifestations of ulcerative endocarditis aside from the physical signs, the hemiplegia and the continued leucocytosis. He survived another month showing a white count of 25,200, a few days before death. You will at once remark that this case represents something more than pneumonia. That is true, but leaving out of consideration the early heart trouble and the arthritis (the nature of which we were unable to ascertain), it would appear that the pneumococcus was responsible for what remained; that is, a lobar pneumonia (the pneumococcus recovered from the blood), fresh endocarditis (septic in character), an embolus resulting in hemiplegia, and a continued

leucocytosis. This would seem to stamp that case as one of general pneumococcus infection. We find that the man recovered from his pneumonia, but did not recover from the activities of the pneumococcus. It seems to me to be further evidence that a lobar pneumonia includes something in addition to a pneumococcus infection. Ordinarily, the lung produces an immunity and lobar pneumonia should reach defervescence after the lapse of five or ten days; but this case illustrates that the pneumococcus may continue its baneful activities in certain regions of the body in spite of the systemic reaction and the pulmonary immunity following a lobar pneumonia. This is the same point that I wish to make in Case No. 2, in which there appeared a serious pneumococcus infection of the throat after convalescence from pneumonia.

Case 5.—Alcoholic; pneumonia; slight involvement; delirium; severe trauma; acute, general pulmonary edema.

D. H., a waiter, aged thirty-seven, entered the Buffalo General Hospital February 22d, complaining of sore throat, having a temperature of 104° F., pulse 120, respirations 30. It was the fourth day of the illness. He admitted drinking moderately, which was probably an under estimation. On physical examination there was found to be an area of consolidation of the lung, about two inches in diameter, located at the angle of the left scapula. There was no pericarditis. A few coarse râles were heard distributed in both lungs. There was a leucocytosis of 12,000. The second day after entrance, the patient became delirious, over-powered the nurse and jumped from a third-story window, a distance of 40 feet. He fell in a heavy snow bank and seemed not to be seriously injured. Following this, there was little change in the man's condition for three days, the pneumonia did not extend. Then there suddenly developed acute edema of both lungs which terminated fatally in a few hours.

In lobar pneumonia we encounter edema sometimes as the result of cardiac depression, aortic disease, or from uremia; also as an inflammatory edema associated with pneumonic lesions. In this case the edema seemed independent of any of these causes. What was the probable reason for the sudden acute edema in this case? Was it agonal? Let me postpone the question for a moment while I report another case.

Case 6.—Sudden invasion; high temperature, pulse and respiration; thoracic pain; termination by crisis; physical signs of localized edema.

Mrs. M. B., aged forty-six, subject to rheumatism and chronic endocarditis, entered the hospital on March 21st, suffering from weak heart and indigestion. On the morning of the 29th, her temperature suddenly rose to 104° F., pulse to 120, respirations to 32. There was herpes, moderate cyanosis, pain in the left chest, and the general appearance of pneumonia. Posteriorly, over the left chest, from the scapula downwards, there were heard diminished vesicular breathing and very faint friction sounds or crepitation. The voice sounds were unaltered. The reso-

nance on percussion was slightly diminished. A few scattered moist râles could be heard throughout the chest. The signs were otherwise negative and continued to be so. She had a leucocyte count of 15,200. Three days afterwards there were secured a few c.c. of fairly clear, mucoid sputum, containing brownish and gray particles in which were found many staphylococci, streptococci and large bacilli, besides many definite pneumococci. Three days after the seizure, the fever ended by crisis, and on the fourth day the temperature was normal and continued so. I regard this as a case of lobar pneumonia which went no further than a local pulmonary edema. In this connection, I desire to call your attention to a communication from MM. Guillain and Laroche, reported before La Société Médicale des Hôpitaux, on February 26th last (*Bulletin Médical,* March 2nd, 1910), entitled "Acute Edema of the Lung, the Sole Manifestation of Pneumococcus Infection." The authors report the case of a man forty-five years old, who, while in perfect health, was suddenly seized with acute pulmonary edema, with extreme dyspnea, in all features characteristic. He was relieved by blood-letting. The edema could not be attributed in this case to aortitis, nephritis or heart failure, but the day following his attack there was recovered sputum in which a virulent pneumococcus was found to be growing abundantly. In this case there was no fever and no auscultatory signs of pneumonia; the edema was the unique clinical manifestation. These authors regarded the edema as a manifestation of the pneumococcus infection of the lung, abortive in character, what might be called a frustrated type of pneumonia and the equivalent of that disease, and they make the interesting suggestion that in cases of this sort we are in the presence of an intense and salutory reaction of defense in which an immunity is quickly produced. The thought is an interesting one, and throws some light upon certain unexplained cases of acute pulmonary edema. This case differs from the last reported in my group in which the edema was localized and was accompanied by a fairly typical clinical picture of lobar pneumonia. It differs from the case preceding the last in which the edema was of that kind which we are accustomed to relate to the death agony. I am not sure that we are correct in our understanding of these terminal edemas. They are usually fatal, but occasionally are aborted by bleeding. Often the edema appears suddenly when the patient otherwise seems doing very well. I believe that there are cases of sudden edema usually regarded as a terminal or agonal edema which in point of fact are the result of local reaction to the pneumococcus and not primarily to the general failure of the patient. You will understand me as not denying that edema of the lung may develop as a final event in pneumonia as well as in other diseases. I am merely attempting to emphasize what seems to me to be a fact that the sudden edema appearing when the patient's general condition does not prepare us for such a development is not necessarily a terminal edema, and it may bear some relation to the edema described by the French authors.

Before the same Paris society, on a later date, was made a contribution on the same subject by M. Fernand Besanc (*Bulletin Médical,* March 9th, 1910), who relates cases somewhat similar to my own, in fact goes further by explaining that in edema of the lung which follows defect of the aorta or kidneys, there will be found in the expectoration evidence of an extensive pneumococcus infection of the lungs; and in cardio-renal cases with edema, he says that we meet with syndromes characterized by fever, oliguria, increased albuminuria with pulmonary symptoms, accompanied by expectoration in which the pneumococcus is found abundant and almost as a pure culture. Finally he relates cases that accord with the last two reported by myself in which the edema is explained by the direct action of the pneumococcus. I am inclined to attribute considerable importance to these communications for the reason that they offer an explanation of phenomena, the origin of which I have hitherto failed to understand.

THE SYMPTOMATOLOGY OF CONGENITAL PYLORIC STRICTURE IN INFANTS.

By Charles Greene Cumston, M. D., of Boston.

The etiological factors of the pyloric syndrome in infants have remained rather obscure until recently. This affection arises in babies born at term who have presented nothing abnormal either in their weight or their general makeup at birth. Exceptionally, some have presented other congenital malformations; for example Ashby relates the case of an infant having an inperforate rectum, while Brandt records another where a stenosis of the ileo-cecal orifice was present along with the pyloric syndrome.

There is nothing particularly characteristic in the infant's heredity; pregnancy has usually been gone through with without any incident, although Ibrahim has pointed out that the mothers frequently suffered from gastric disturbances during their pregnancy.

Far more interesting is the study of the collateral antecedants, because, as Henschel has pointed out, three babies in the same family presented the pyloric syndrome, while Freund, Koppen and Ibrahim have recorded similar cases. However, such instances are infrequent.

The sex is of little importance, because out of a total of 30 cases there were 18 boys and 12 girls. Maternal or artificial nursing appears to have no bearing on the case, but it is not infrequent to remark that faulty feeding has been given, whether the child was breast fed or artificially.

The pyloric syndome is a little known affection and if the number of published cases is to be considered as an expression of the frequency of a disease, one should conclude that the pyloric syndrome is very infrequent.

The theories emitted to explain the pyloric syndrome, although numerous, may be divided into three groups. In the first, we would place the opinions of those who admit a congenital malformation, a primary hyperplasia of the pylorus, without any spasm of the organ. In the second group we would place the partisans of secondary muscular hypertrophy, this being engendered by a spasm having commenced during intrauterine life or having appeared after birth. In the third group we include the theory which considers the syndrome as being due to a simple spasm of the pylorus, the muscular hypertrophy being only secondary, one of the manifestations of contraction of the organ.

According to the first group of theories, the increase in the thickness of the pylorus is the result of a disturbance in the development; there

is a hyperplasia of congenital muscular tissue. According to Rivière the hypertrophy of the stomach and esophagus often co-exist with that of the pylorus and is simply a manifestation of the same anomaly in development, there being a too great formation of muscular tissue throughout this portion of the digestive tract, and he relates, relative to this primary hyperplasia of the pylorus, two cases where in one a hypertrophy of the colon was found, while in the second there was hypertrophy of the bladder. Flynn and Murray invoke comparative anatomy and Darwin's theory, believing that hypertrophy of the sphincter muscle, which accidently exists in infants, is only a reproduction of a type that is normally encountered in edentated animals. According to Finkelstein, the hypertrophy is acquired secondarily, but here again the obstacle is congenital. For an unexplained reason, the infant is born with a narrow pyloric canal from which stagnation of the contents of stomach results, having as a consequence a complementary hypertrophy of the walls of the stomach and pylorus.

In the second group the authors admit that the thickness of the muscular layer of the pylorus is consequent upon spasm. Starting upon the basis that repeated contraction of a muscle engenders hypertrophy, a fact, they say, that can be quite as well verified in the case of unstriped fibers as for striped fibers, they believe that a similar phenomenon takes place in the pylorus. Thompson, who is a partisan of the theory of congenital hypertrophy, admits that the spasm commences *in utero,* following upon some irritative process, perhaps ingestion by the foetus of the amniotic liquid. This spasm exercises its effect on the development of the gastric nervous system and becomes permanent, from which arises the muscular hypertrophy. Here, again, the muscular hypertrophy, although secondary to spasm, exists before birth. According to Dawosky, the spasm occurs only after birth and is quite analogous to spasm of the pylorus in the adult produced by some irritating cause seated in the stomach.

The third group believe that the pyloric syndrome is due alone to spasm of the pylorus, and here it is necessary to consider the researches of Pfaundler on the stomach of nursing infants, which seems to us to considerably enlighten the question. His researches were carried out on a large number of stomachs, the babies having died from various diseases. They led him to consider several varieties of stomach, two of them particularly should call our attention—namely, (1) Those stomachs which he terms *systolic,* having thick, resistent and hard walls, having the aspect of a regular elongated tube of small capacity; (2) The second which he terms *hemisystolic,* in which the apparent thickening is only present in a portion of the stomach, particularly in the pyloric region. One then sees at a place in the pylorus a tumor with thick, resistent and hard walls, lined interiorly by the gastric mucosa; the pyloric orifice is contracted, hardly allowing the passage of a small catheter. Quite frequently also

a small projection, which may be compared to the cervix uteri, will be found on the duodenal side. Microscopic sections show that there is a thickening of the muscular layers. The systolic condition of the stomach may be made to cease by an injection of water under pressure into the gastric cavity. The muscular hypertrophy already described disappears and the stomach regains its normal condition.

Pfaundler found a great similarity between the hemisystolic stomachs and those met with at the autopsy of babies having died from stenosis resulting from a congenital hypertrophy of the pylorus. He insists upon the fact that, in many cases of congenital stenosis where autopsy has been done, that a true stricture of the pyloric orifice has never been found. In every instance it was a case of systolic stomach, whose pyloric orifice, the lumen of which appeared as if it would not allow the passage of a pin, regained its dimensions just as it did in those stomachs that Pfaundler dilated with water under pressure.

Still's researches on the pathological anatomy of this lesion seem to show that the circular muscular structures of the pylorus vary in thickness, even in subjects presenting no lesion or gastric phenomena during their entire life, but from the two cases that I have operated on, both of which showing such evident muscular hypertrophy that the pylorus was as large round as a good sized spool, it is very hard for me to believe that the lesion is not a congenital hypertrophy of the organ and that spasm plays no part whatsoever, or at any rate very little, in its production. I am fully aware that many eminent authorities uphold that the hypertrophy is due to spasm produced by an erosion of the gastric mucosa, but I still maintain that such marked hypertrophy of the pylorus cannot take place from spasm alone, more particularly so, when one takes into consideration the very short period of life during which the action of any spasm might intervene.

I will now consider the symptomatology of congenital stricture of the pylorus. The elements forming the pyloric syndrome may be classified under two headings. The first comprises the constant functional symptoms which appear at the commencement of the affection of arise during its progress. These are vomiting, occurring soon after birth and characterised particularly by its recurrence and persistency; and an obstinate constipation accompanying the vomiting. The second group of symptoms comprises those unconstant physical signs which are particularly to be observed after the syndrome has been present for a certain length of time and result in a certain amount of loss of flesh. These are peristaltic movements of the stomach and the presence of a pyloric tumor felt by palpation. I would, however, point out that the presence of a pyloric tumor is often difficult to detect on account of the large size of the liver in the newly born and young infants and in both my cases, although the neoplasm was of very large size in relation to the size of the subject, and although both subjects were extremely emaciated when operated

on, the lesion was not found until after the abdomen had been opened although a correct diagnosis had been made before interference.

Occasionally one will be dealing with a child from three to four weeks of age who has remained in excellent health from the time of birth and who, all of a sudden, without any appreciable cause commences to vomit all the milk ingested, while the stools which were up to that time regular, become infrequent. In spite of all the attempts to control vomiting it nevertheless persists, bringing about a very marked loss of flesh. Sometimes peristaltic movements of the stomach may been seen under the anterior abdominal wall, but as I have already pointed out a tumor in the pyloric region is less apt to be perceived.

The commencement of the process is not always as sudden and dyspeptic phenomena of a more or less pronounced type may be fore-running symptoms. From its birth the child may have been subject to frequent regurgitations which have not caused any particular alarm, while a diarrhea may have preceded the primordial manifestations of the syndrome for a few days, the latter consisting of vomiting and constipation. Sometimes, this dyspeptic stage is so marked that it is a difficult matter to come to a conclusion as to the exact time when the pyloric stage of the affection has become developed. Generally speaking, from the time that vomiting commences the diarrhoea suddenly stops for the simple reason that a very small amount of milk enters the intestin so that the latter loses its functions and the diarrhea ceases.

The time of commencement of the symptoms varies extremely, because the syndrome has been met with during the first days of life or it may be so delayed that the child reaches two or three months before it is manifest. But in going over the recorded cases it is from the second to the fourth week that the first symptoms make their appearance in the large majority of cases.

The vomiting occurs within the hour following the ingestion of milk and usually it is from twenty to thirty minutes after nursing; exceptionally it may take place later, occurring from one to two hours afterwards. It is in large quantity and usually corresponds in volume to the amount of milk taken at the feeding.

Occasionally the absence of vomiting following one or two consecutive feedings may lead one to hope that a small amount of milk will be retained, but disappointment comes, for the following nursing will give rise to a very abundant vomiting, because there has been accumulation and stagnation of the preceding nursings and the child seems to vomit more milk than he absorbed.

The vomiting usually occurs without any effort but occasionally it seems to be preceded by nausea during which the little patient appears to suffer, but after the stomach has emptied itself the infant is again calm. It is to be supposed that the vomiting, putting an end to the peristaltic movements of the stomach thus causes the pain which the latter produce, to disappear.

At the commencement of the affection the vomitus is only composed of curdled milk or it may contain rather fine curds; when the syndrome is of longer standing it will contain quite a large quantity of mucus and at this time it is not at all infrequent to find streaks of blood floating in the mucus.

Bile is never found, a fact which has been noted by all observers, and many attribute to this fact a certain value from the diagnostic standpoint because it would seem to show that the obstruction is seated in the pylorus and shuts off all communication between the stomach and the remainder of the digestive tract. According to Weill of Lyons, the absense of bile is not a very significant character from the standpoint of the pyloric syndrome, because to his way of thinking it simply indicates a vomiting taking place without much effort as is often encountered in nursing babies. Generally, the vomitus is odorless but when it has an odor lactic or butyric fermentation is the cause. The vomiting is far more rebellious than other varities that are ordinarily observed in nursing infants. Generally, in the ordinary dyspepsias of early infancy a strict diet of one or two days will cause the gastric disturbances to disappear, while in the pyloric syndrome gastric incontinence is absolute.

With the appearance of the vomiting constipation becomes evident and an inverse relationship becomes established between the number of the movements and that of the vomiting. An infant who rejects all the nourishment taken naturally manufactures a very small amount of fecal matter, so that the bowels may not move for several days or even a week without giving rise to any apparent inconvenience.

The stools are usually composed of a small amount of mucus to which the addition of bile gives a greenish tinge. And lastly, and this is a symptom of the greatest importance, there are never any caseous lumps in the stools as long as the syndrome is in its acute stage; if they do appear they indicate that the pylorus has a tendency to become patent. Constipation may disappear for a few days during which there are normal stools or even diarrhea and in some of these cases this condition of affairs is probably due to an enteritis set up by the excessive use of nutritive enemata.

The baby loses much weight in a few days on account of the incessant vomiting and if the abdomen is examined at this time one is immediately struck by the difference existing between the lower part of the depressed abdomen which covers the empty and collapsed intestinal loops resulting from the pyloric obstruction, and the epigastric region which is distended and may even considerably project. Here the abdominal wall is tense and thin and under the recti muscles which are separated from each other along the linea alba to a considerable extent, the dilated stomach may be perceived. This marked change in the epigastric region cannot take place unless there is a marked distension of the stomach which, in the normal condition in the young infant, is partially covered by part of the liver and the transverse colon.

In order to make the peristaltic movements of the stomach evident the loss of flesh must also be accentuated. Sometimes the stomach renders the abdominal wall tense, forming a dome which becomes displaced like a wave, crossing over the epigastric region in from two to three seconds. On other occasions the constriction appears in the middle of the primary dome dividing it into two projections in which case the stomach takes on the shape of an hour-glass.

The direction of the peristaltic waves is slightly oblique from left to right, thus about following the greater curvature. The direction in which these movements are produced allows one to differentiate them from those arising in the colon, which are directed in an inverse sense. For that matter, in the pyloric syndrome the colon, which is collapsed and retracted towards the spine, cannot give rise to this cause for error.

Besides these peristaltic movements a contraction of the entire stomach is quite frequently met with and is a sort of tetanic condition of the organ which lasts for about twenty seconds. The various shapes taken on by the stomach are so clearly designed on the anterior abdominal wall that it might be imagined that the latter covered a solid organ, in which case the greater curvature can be palpated with as great ease as the border of the liver.

These various phenomena occur more or less shortly after the ingestion of food but sometimes they may be produced by friction over, or shocks upon, the walls of the stomach. They have been seen to remain longer than the other symptoms of the affection and may occur at a period when the vomiting has stopped.

The dilatation of the stomach noted in many cases may be made evident by the tympanitic sound elicited by percussion over the epigastric region, and by palpation, from the sensation which a gastric catheter gives when applied against the greater curvature.

These signs give sufficient indication as to the condition of the organ without any further exploration. I would point out that insufflation of the stomach may give rise to very serious symptoms and should, therefore, under no circumstances be resorted to.

In those cases where, on account of the rigidity of the stomach, the greater curvature shows its contour on the abdominal wall, simple inspection of the region will in itself allow one to determine the lower limits of the organ. A study of the peristaltic movements will allow one to come to the same result, the lowest point where these movements are seen practically coincides with the greater curvature. The lower limits of the stomach may reach to the umbilicus or even below and it has been noticed that the most declivous point is to be found a little to the right of the medium line, this point corresponding to the pyloric antrum, the region of the stomach where dilatation is occasionally very marked.

Palpation will occasionally allow one to feel a tumor in the pyloric region but in looking over a long list of reported cases I find that it

has only been detected in about 25 per cent. When it is to be found, it is seated slightly to the right of the middle line 2 centimetres above the umbilicus, or thereabouts, and gives to the exploring hand the sensation of a little rounded elongated mass, possessing a certain mobility. The tumor is never detected at the commencement of the symptoms and in those cases where the syndrome commenced a few days after birth its presence could never be detected before the twenty-seventh day. This fact has served as an argument to refute the hypothesis of the congenital origin of the affection, but it is more likely that in order to carry out successfully such delicate palpation, it is necessary that there should be a special condition of the abdominal wall which is only to be met with when there is pronounced wasting and cachexia.

In one case, Batten noticed that the pyloric mass was not always to be felt by palpation and could only be perceived when the peristaltic movements could be seen under the abdominal wall or when the infant vomited.

When gastric lavage is resorted to the manifestations of motor insufficiency of the stomach are distinctly evident. The organ is never found empty and where the sound has been passed from four to five hours after the last nursing from twenty to fifty grammes of milk may be withdrawn, sometimes even a larger amount of liquid than was ingested at the preceding nursing. The contents are usually composed of mucus in which flakes of varying sizes float; when cow's milk forms the base of feeding these flakes are much thicker and denser than those withdrawn from the stomach of breast-fed infants. The question of the gastric chemism in the pyloric syndrome is far from being settled. While Finkelstein, Fenwick, Gran, Abel and Schotten were unable to find free hydrochloric acid but the presence of lactic acid and the fatty acids, other authors, as for example, Freund and Ibrahim, have found free hydrochloric acid more or less constantly in the contents drawn from the stomach. The former authority even considers this hyperhydrochloria a fundamental point in the pyloric syndrome when he concludes that there is a possibility of a primary hyperhydrochloria which sets up spasm of the pylorus.

Microscopical examinations undertaken by Gran showed the presence of a more or less considerable quantity of leucocytes and fat globules; there were no epithelial cells coming from the gastric mucosa. The bacteria found were various forms of cocci, diplococci and coliform bacilli and sarcinae.

Other than the phenomena met with in the stomach itself, an exploration of the other organs gives no further light on the question unless certain of the complications arise. The general condition becomes rapidly changed during the progress of the pyloric syndrome, the incessant vomiting having brought the child into an excessive loss of flesh and even cachexia. The urine is scanty and all the more so the more frequent

the vomiting; it may occasionally contain albumen and casts. Usually the temperature becomes slightly lowered and never, during the progress of the pyloric syndrome has a rise in temperature been noted, unless some complication arises.

Now that I have described the various symptoms forming the pyloric syndrome in the infant, I must endeavor to show how these symptoms become grouped and modified during the progress of the affection and in order to do so, some of the clinical types must be passed in review. There exist very serious forms where the recurrence and abundance of the vomiting reduce the little patient to a state of extreme atrophy in from two to three weeks. Frequently, the dyspeptic disturbances at the commencement are mild when, on the contrary, the benign types will be found to succeed very marked gastric disturbances. There is, consequently, no direct relationship between the forerunning dyspeptic symptoms and those of the pyloric syndrome that they engender.

When once the vomiting has become declared, everything for its control is useless and time is lost in trying to change the nature or quantity of the feedings for the vomiting will continue. This will continue until the child is in such a state of cachexia that death occurs. Physicians frequently resort to gastric lavage at this time which, of course, is useless and may even be dangerous as it greatly increases the already exhausted condition of the infant. During this time there is no movement and two or three, or even more days may pass without any intestinal evacuation; intestinal enemata are usually repeated, always unsuccessfully, the fluid returning hardly colored or, if so, it is only from the mucus.

It is in this type of the affection that peristaltic movements of the stomach are observed very early in the progress of events and not infrequently palpation will reveal a tumor in the pyloric region. Loss of flesh is rapid and death will occur if operative measures are not quickly resorted to.

In some few cases the feedings may be retained for a few days and the child may only have one or two attacks of vomiting a day. A little undigested milk appears in the stool and the general impression is that the infant will recover. But the vomiting soon reappears with all its former severity and it is with these alternatives of improvement and recurrence that finally lead to death because operation is delayed. This condition of affairs may last several months although this is far from being common.

Certain so-called attenuated types of pyloric obstruction have been described in which the attacks of vomiting are not so frequent as in the form already considered. Two or three attacks of vomiting a day is about all that happens, and although there is constipation it is not absolute and from time to time the child voids caseous curds in the fecal matter. Occasionally, during a short lapse of time, the infant may have spontaneous and nearly normal stools. The peristaltic movements and a

pyloric tumor are hardly, if ever, perceived. Certain internists believe that if the quantity and quality of the milk can be made to suit the infant, a cure may be brought about, but in my opinion if such a result is obtained, the case is not one of true congenital pyloric stenosis.

There are other types in which the dyspeptic phenomena preceding the development of the affection are more marked than the symptoms of the latter. During the first month of life, the infant is seized with regurgitations, more or less regular vomiting, he has from three to four loose stools daily, while the body weight increases very slightly or remains stationary. This condition may exist for two or three weeks and then suddenly the pyloric obstruction will completely change the clinical aspect of this catarrhal condition. The vomiting increases in frequency, becomes abundant and regular, occurring nearly after each feeding, while the diarrhoea disappears and constipation supervenes; the pyloric syndrome then evolutes on its own account with more or less gravity. As has already been pointed out, there is not of necessity a direct relationship between the intensity of the dyspeptic symptoms and the gravity of the superadded pyloric state and it would even appear that the types in which the gastric disturbances have been the most intense at the commencement are more prone to give rise to a milder pyloric syndrome.

There is still another form described by Weill and Péhu under the name of *essential pyloro-spasm of infancy,* which from certain symptoms is in a way similar to the pyloric syndrome but is different in many others. Pyloro-spasm generally commences with regular, easy vomiting, without odor and occurring from a quarter to a half hour after the feeding. Other than the vomiting, there is no other symptom such as diarrhea, constipation, pyloric tumor, or peristaltic movements of the stomach accompanying the regularly recurring attacks of vomiting. There is a progressive decrease in the body weight, while the appetite is normal or even somewhat exaggerated, but there is no change in the general condition which would indicate an infection or intoxication and the temperature is never raised. I have mentioned this condition on account of the prominence of the men who have described it, but personally I have never been consulted surgically for any condition that I could diagnosticate as pyloro-spasm.

I have pointed out that the serious types of pyloric obstruction are characterized by an acute phase which may last from two to six weeks; then the affection continues its evolution with periods of slight improvement, alternating with those in which the vomiting takes on all its intensity. I believe that no genuine case of congenital pyloric obstruction has ever heen recovered from unless gastro-enterostomy is resorted to. Otherwise death occurs sooner or later in the serious forms within a few weeks from the onset, in the less rapidly progressing cases life may be prolonged several months.

A certain number of complications may occur during the pyloric syn-

drome, particularly when the latter is well advanced and they are always of bad prognosis. These complications are foci of broncho-pneumonia, convulsions, sometimes accompanied with the Cheyne-Stokes respiration. Occasionally the convulsions have been seen to take on the tetanic type.

When all symptoms are present, the syndrome has such distinct characteristics that it is most easy to diagnosticate. Vomiting occurring during the first week following birth, persisting in spite of every form of feeding, a more or less marked constipation, the small amount of residu coming from the rectum being composed of greenish mucus containing no curds; a progressive emaciation with the flattened abdomen, occasionally allowing one to perceive peristaltic movements over the stomach; less frequently the detection of a pyloric tumor revealed by palpation; all these signs when they are present make the diagnosis evident.

There are, however, cases in which the peristaltic movements are not visible and a very large number where no pyloric tumor can be detected, so that the problem becomes more complex and hesitation is quite permissible. It would seem to be a difficult matter to mistake the regurgitations of an overfed infant for the vomiting due to pyloric stenosis. The regurgitation immediately follows the ingestion of milk and the feeding is rejected in a liquid and non-coagulated condition, the general health is not disturbed, the child does not lose flesh and all the symptoms disappear when the nursings have been properly regulated.

It is a more delicate question when one is dealing with certain types of infantile gastro-intestinal dyspepsias. I am not referring here to the frank types, in which the vomiting is accompanied by a diarrhea containing a large amount of undigested milk, but to that form described by Marfan, under the name of dyspepsia with predominance of gastric phenomena. In these cases the vomiting predominates, there is no diarrhea, stools are normal, both in number and quality. One may rightly hesitate before making a diagnosis of a mild type of pyloric syndrome or of this form of dyspepsia. The rapid cessation of the vomiting as soon as the infant is placed on a water diet, attacks of diarrhea occasionally occurring in the midst of periods of normal stools, the history of the illness which will show the mistakes commited in the feeding are quite enough to lead the physician to a diagnosis of dyspepsia with predominating gastric symptoms.

In the types of chronic dyspepsia observed in nursing infants who are receiving artificial feeding, there is constipation, but the latter is often interrupted by attacks of diarrhea, a fact which has given it the name of chronic dyspepsia with intermittent intestinal catarrh. And what is more, vomiting is frequent, the abdomen becomes large and lax on account of the elongation of the intestine, so that all these symptoms are sufficient to differentiate the affection from the pyloric syndrome.

Exceptionally, one may be obliged to differentiate symptoms produced by a stricture resulting from some congenital malformation of the diges-

tive tract, from the pyloric syndrome. In point of fact, these cases which are very rare, are characterized by much earlier phenomena and from the start are far more serious than those of the pyloric syndrome. They occasionally even present certain signs of their own which will allow one to locate the seat of the lesion.

Congenital stricture of the esophagus is made evident by regurgitation rather than by vomiting; the milk is rejected almost as soon as taken without having undergone any change from the addition of the gastric juice. Occasionally the infant will present cyanosis after feeding because the oesophageal cul-de-sac, distended with the fluid, acts by compression on the hilum of the lungs.

In pyloric stenosis of the congenital type and which has contracted down at the time of birth so that the syndrome becomes evident during the first day or two of life, there will be complete constipation and after he meconium has been expelled there will be no stool. The effect on the general health is very rapid and intense and unless gastro-enterostomy is immediately resorted to death will occur within a week or ten days.

Congenital stricture of the intestine also gives rise to tenacious vomiting and constipation; the meconium is not always expelled and, a sign of capital importance, the abdomen becomes rapidly distended. Bile will also be found mixed with the vomited matter.

This picture of acute intestinal occlusion may also occur during various processes, some being frequent like intestinal invagination, others far more rare, such as neoplasms, but they can hardly be mistaken for a congenital pyloric obstruction. The vomiting of the acute peritonitides of the newly born is accompanied by abdominal distension, frequently a very marked diarrhoea and a rise in temperature, all being symptoms which distinctly differentiate it from the vomiting of the pyloric syndrome.

871 Beacon Street.

A SAFE GUIDE FOR THE ADMINISTRATION OF TUBERCULIN.

By Oscar H. Benker, M. D., of St. Louis,
Clinician to Washington University Hospital.

After a period of bitter disappointment which followed the first tuberculin era in the nineties, due to a faulty technique and erroneous conception of its action, tuberculin has won to-day a definite position in our therapeutic armamentarium.

It still has, however, many enemies, among which are primarily the men who condemn all things without a trial, and others who through the production of toxin intolerance have had disastrous results.

The great majority of clinicians the world over hold that tuberculin used carefully, beginning with minimum doses, increasing slowly and extending the treatment over a year or two, produces results such as no other remedy or treatment does, climatic treatment not excluded.

The tuberculin therapy, therefore, belongs to the province of the family physician, whose duty it is to familiarize himself with the underlying principles and to master the technique of its administration.

It is the purpose of this paper to make more generally known a method for its administration, which is absolutely safe, applicable to all tuberculins and advocated and used for a number of years by Sahli.

That tuberculin is both an agent for good and for harm has been amply demonstrated in the twenty years of its existence.

To overcome the harmful side of the tuberculin therapy, Sahli has given us a scale which allows a much finer dosage than the ordinarily used scale of Denys.

The two illustrations taken from Sahli's monograph on tuberculin therapy show clearly the difference between the two scales.

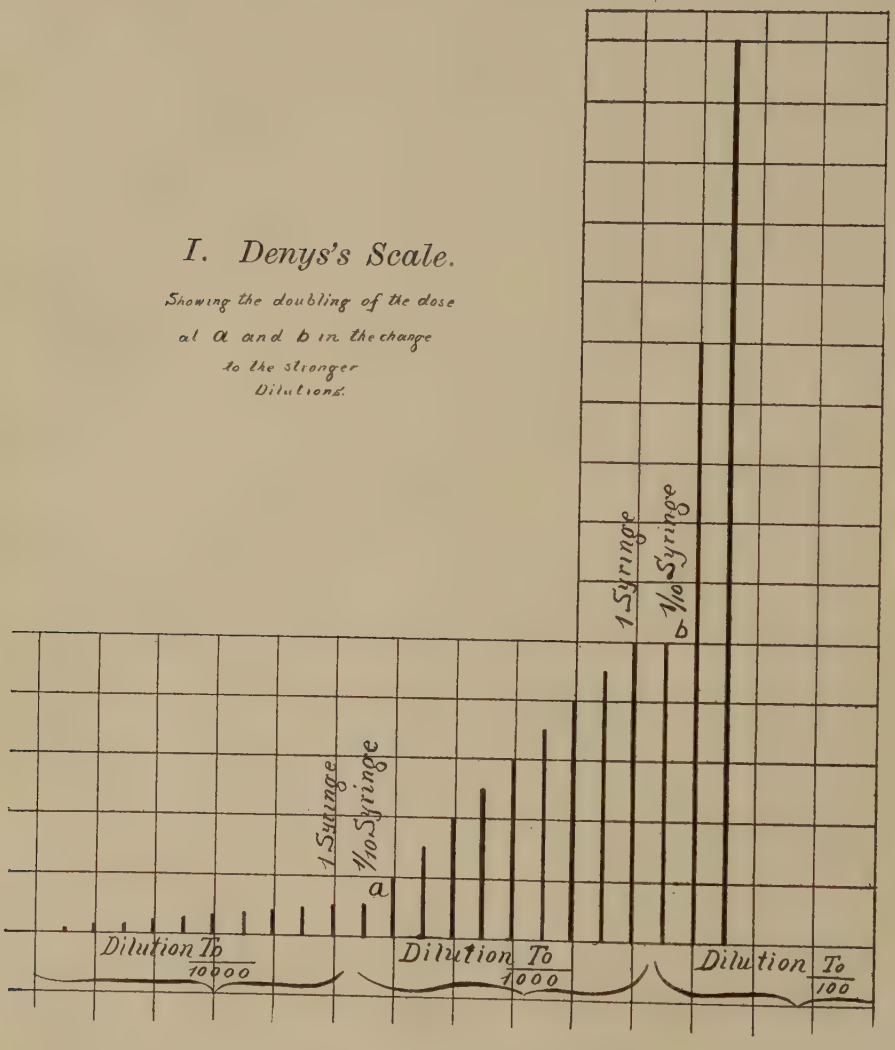
Denys's scale follows potencies of 10, while Sahli's recommends potencies of 2, to avoid the doubling of the dose which occurs according to Denys's scale when a stronger solution is used. In Sahli's scale the increase is only by ½.

From theoretical views and practical results, Sahli has come to the conclusion, that the underlying principle for treatment is the same with all tuberculins, but that Béraneck's tuberculin has certain advantages.

This I have been able to confirm after comparing my results with O. T., B. E., B. F., both human and bovine strains.

Béraneck's tuberculin is a mixture of the exotoxins extracted from a peptone—free medium—and the endotoxins extracted from the tubercle bacilli with 1 per cent. orthophosphoric acid.

This tuberculin in its concentrated form is a strong germicide, killing the tubercle bacilli in forty-eight hours. This latter quality has been demonstrated in surgical tuberculosis where it has been used successfully as intrafocal injections.



To the normal individual it is only slightly toxic, while tubercular subjects react to doses of 0.000001 c. cm.

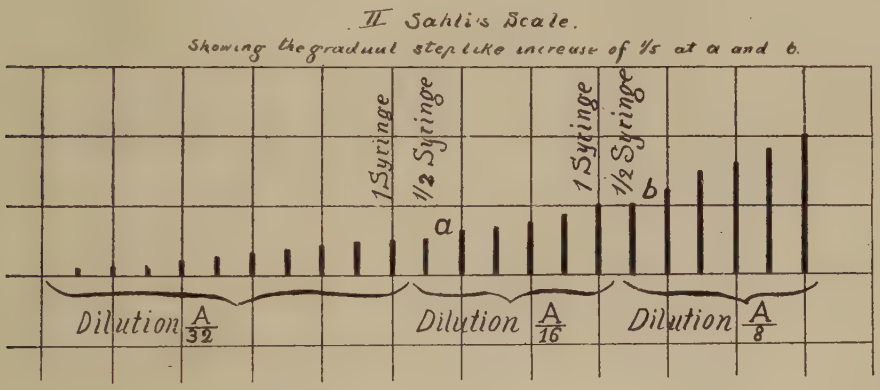
Béraneck's tuberculin is obtainable in nineteen dilutions as follows:—

H.	G.	F.	E.	D.	C.	B.	A.	A. 2	A. 4	A. 8	A. 16	A. 32	A. 64	A. 128	A. 256	A. 512	A. 1024	A. 2048

H. is the strongest solution used therapeutically and is 62½ times weaker than the concentrated Béraneck tuberculin.

The dilutions are made with an 0.8 per cent. solution of sodium chloride under strict asepsis.

For adults, who are free from fever, 1/20 c.cm. of sol. $\frac{A.}{64}$ is a safe dose to commence the treatment. In slight elevations of temperature up to 100° F., I usually start with 1/ c.cm. of $\frac{A.}{256}$ In severe cases where absolute rest, outdoor treatment or the salicylates fail to reduce the temperature, I have given 1/20 c.cm. of $\frac{A.}{2048}$ a trial with some success. It is well to repeat the first dose two or three times; if well tolerated each dose is increased by 1/20 c. cm. until ½ c. cm. of $\frac{A.}{64}$ is reached. If ½ c. cm. of $\frac{A.}{64}$, after repeating the dose two or three times, produces no reaction, then 1/20 c. cm. of $\frac{A.}{32}$ is injected in the same



manner as the previous injections, and so on until the whole scale has been run through.

If during the course of treatment reactions occcur, these are allowed to wear out entirely and the treatment is recommenced with lower doses.

The injections are made twice a week; when stronger dilutions are reached, only once a week, and with the strongest solutions G. and H., only every fourteen days.

It will be found in practice that it is not necessary to reach the maximum dose; in fact, at times this is impossible. I have noticed cases which do well on ⅕ c. cm. of $\frac{A.}{64}$, increase in weight, where the signs and symptoms of the disease disappear; but when the next dose 3/10 c. cm. is used become febrile and decline. This observation has been reported by Sahli, Mantoux and others. Mantoux recently reported a case of renal tuberculosis in which one kidney had been removed for a tubercular infection and the remaining kidney became involved. He treated the case with Béraneck's tuberculin, starting with 1 drop of $\frac{A.}{256}$, but reducing the dose to sol.

$\frac{A.}{512}$, of which the highest dose used was 7 drops.

All objective and subjective symptoms disappeared in this case.

Thus in each case an optimal therapeutic dose is reached, varying in the scale from the weakest to the strongest solutions, on which the patient improves and which should not be exceeded until the case becomes stationary when the dose is again increased.

In a given case we may thus reach several optimal doses and finally come to the maximum dose; on the other hand, perfecctly satisfactory results are obtained on dilutions from $\frac{A.}{64}$ to A. without ever reaching H.

To show this more clearly I will cite a case now under observation, where a temperature of 100° F. was reduced to the normal on dil. $\frac{A.}{256}$ and the patient gained eight pounds in weight in three months.

It will be seen that a high toxin tolerance is not necessary for good therapeutic results.

Fever, pain, malaise, focal reactions, loss of weight, all or only one of the enumerated signs, shows that the optimal dose has been exceeded, requiring, therefore, a reduction of the dose.

The indications and contra-indications for a successful tuberculin therapy apply also here.

In conclusion I wish to emphasize that not all cases will tolerate tuberculin, no matter in which way it is used. For these climatic treatment, remineralization and other methods of treatment must be sought for. However, one thing strands out preëminently in this method of tuberculin treatment—namely, that it is safe and will not harm the patient and can be used in private as well as dispensary practice.

3618 South Jefferson Avenue.

MEDICAL AND SURGICAL PROGRESS.

THE USE OF MOMBURG'S CONSTRICTION-BELT IN OBSTETRICAL PRACTICE.

A REVIEW OF RECENT LITERATURE.

By. HUGO EHRENFEST, M. D., of the Editorial Staff.

1. Amberger: Death after Application of the Momburg Belt. (*Beitr. zur klin. Chir.,* April, 1910.)
2. Blecher: Metal Spiral Spring for Belt Constriction. (*Muench. med. Wochenschr.,* No. 27, 1910.)
3. Burk: Momburg's Belt*: (*Beitr. zur. klin. Chir.,* June, 1910.)
4. Carere: Experiments with Belt Constriction. (Orig. in *Riforma Med.,* Abstr. in *Jour. Amer. Med. Assoc.,* p. 2010, June 11th, 1910.)
5. Duehrssen: Metreurynter-Incision (*Gyn. Rundsch.,* H. 1, 1910.)
6. Ehrlich: Exclusion of Musculature as Source of Heat Production during Momburg Constriction. (*Wien. klin. Wochenschr.,* April 7th, 1910.)
7. Engelhorn: Digital Compression of Aorta as a Means of Arresting Placental Hemorrhage: (*Zentralbl. f. Gyn.,* No. 16, 1910.)
8. Engelmann: Momburg's Anemia in Obstetrics. (*Arch. fuer Gyn.,* Vol. 90, H. 1.)
9. Flatau: (*Muench. med. Wochenschr.,* No. 7, 1910.)
10. Frankl: Experiments with Momburg's Waistline Constriction. (*Gyn. Rundsch.,* H. 2, 1910.)
11. Gelyi: Modification of Momburg's Constriction. (*Mediz. Klinik.,* August 28th, 1910.)
12. Gerster: Momburg's Method of Artificial Anemia by Suprapelvic Constriction. (*Annals of Surg.,* June, 1910.)
13. Gross and Binet: Fatalities During Belt Constriction. (*Revue de Chir.,* May, 1910.)
14. Hoehne: Compression of One or Both Ureters by Means of Momburg's Belt. (*Muench. med. Wochenschr.,* No. 8, 1910.)
15. Hofstætter: Treatment of Post-Partum Hemorrhage. (*Mon. fuer Geb. u. Gyn.,* October, 1910.)
16. Ilmer (*Gyn. Rundsch.,* No. 14, 1910).
17. Kroening (*Deutsche med. Wochenschr.,* November 18th, 1910).
18. Kupferberg (*Muench. med. Wochenschr.* No. 24, 1910).
19. Liepmann: Das geburtshilfliche Seminar. Berlin: Hirschfeld, 1910.

*Wherever in this bibliography the exact title of the paper is not given it is Momburg's Belt Constriction.

20. Matas: Momburg's Artificial Anemia. (*Jour. Amer. Med. Assoc.*, p. 163, July 9th, 1910.)
21. Momburg: Artificial Anemia of the Lower Half of the Body. (*Zentralbl. fuer Chir.*, October 10th, 1908.)
22. Momburg (*Deutsche med. Woch.*, December 2nd, 1909).
23. Ordonez (Orig. in Spanish; Abst. in *Muench. med. Wochenschr.*, November 1st, 1910).
24. Popow (Orig. *Russky Wratsch;* Abstr. in *Muench. med. Wochenschr.*, No. 14, 1910).
25. Seitz: Vaginal Hysterotomy: (*Arch. fuer Gyn.*, Vol. 90, H. 1.)
26. Sigwart (*Arch. fuer Gyn.*, Vol. 89, H. 1).
27. Sigwart (*Berl. klin. Wochenschr.*, No. 43, 1909).
28. Sigwart: Treatment of Placenta Previa. (*Zentralbl. f. Gyn.*, No. 28, 1910.)
29. Stolz: Momburg's Constriction in a Case of Ruptured Ectopic Pregnancy. (*Zentralbl. fuer Gyn.*, No. 41, 1910.)
30. Tornai: Influence of Momburg's Procedure on Heart and Circulation. (*Deutsche med. Wochenschr.*, September 8th, 1910.)
31. Weber: Treatment of Post-Partum Hemorrhage. (*Muench. med. Wochenschr.*, May 17th, 1910.)
32. Zur Verth (*Muench. med. Wochenschr.*, January 25th, 1910).

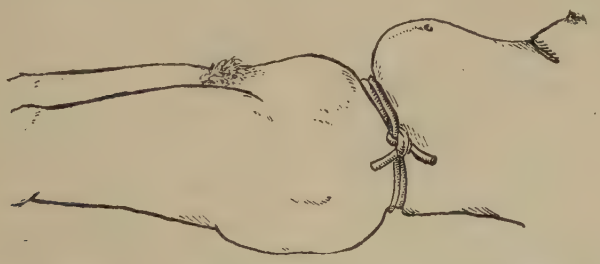
In 1908 Momburg published a short preliminary report of his method of producing an artificial anemia of the lower half of the body by winding a rubber tube tightly around the waistline. His suggestion met the usual fate. At first the procedure seemed too heroic and numerous theoretical objections were raised. Then followed the period of extreme enthusiasm with a criticless exploitation of the method also in most unsuitable cases. To-day the advantages and dangers, the indications and contraindications of Momburg's method seem well understood, and without exaggeration it can be stated that Momburg has given to the profession one of the most valuable and effective methods of arresting the most dangerous forms of hemorrhage. While originally suggested chiefly for the use of the surgeon, Hofbauer, probably as the first, soon recognized the importance of belt constriction in obstetrical practice. A careful study of the literature, already comprising hundreds of articles, leaves no doubt concerning the justification of a demand, made among others by Flatau, that to-day Momburg's belt should be found in every obstetrical bag. In that splendid exposé of practical obstetrics, recently published by Liepmann, we find numerous references to this new method, and we read on page 126: I should advise strongly never to respond to an obstetrical call without taking along a good, strong red rubber gas tube, about two yards long.

Before entering into a discussion of the literature pertaining strictly to the use of the constricting belt in obstetrical work, it may not be amiss to consider first papers dealing with the technique of the procedure, with its dangers, and with experiments made on the human being and animals to ascertain exactly the effect of such tight constriction of the body at the waistline.

In the following we quote a description of the technique as given by Gerster, but it may be stated that obstetrical cases demand a certain variation in the procedure, as will be pointed out later. The patient is placed in Trendelenburg's position. The end of a piece of soft rubber tubing, having the thickness of the index finger, and a length of about four

feet, is passed through under the back of the patient, to be grasped by the hand of an assistant who stands at the other side of the operating table. The tube then is stretched to the utmost, and, thus stretched, is passed by the surgeon midway between the border of the ribs and the iliac crest across the abdomen to the other hand of the assistant, whose duty it is to maintain the tension. The free end of the tube is now led back under the patient by the surgeon and is again put to the stretch, the assistant in the meantime gradually releasing the bent of the stretched tubing which now firmly encircles the waist. While this is being done another assistant places his finger on the femoral artery to ascertain the moment of the cessation of the pulse. Observing the same steps, two, three or more turns of the tubing are exactly superimposed until the femoral pulse disappears. In slim individuals two turns will suffice. In fat or muscular ones as many as six may become necessary. As soon as the femoral pulse is suppressed the ends of the tubes are crossed, to be secured by forceps or ligature.

A more complete anemia can be obtained, if the application of the belt is preceded by bandaging both lower extremities from the toes up to the groin. If after tightening of the belt these bandages are removed and the extremities lowered, the blood contained in the pelvic organs will gravitate down into the limbs.



Momburg's Belt properly applied after labor. From Liepmann's Geburtshilfliches Seminar. 1910.

It seems essential, at the time of the removal of the Momburg belt, to permit the blood only gradually to return into the parts of the body which had been excluded from the circulation. For this purpose constricting bands are applied to both groins below Poupart's ligaments and possibly also below both knees. The successive removal of these constrictions permits the more gradual influx of the blood into the anemic areas.

Already in his first communication Momburg mentions that at times it may become necessary to use morphine for an excessive pain, caused by the constriction. In another paper, Momburg calls attention to the following particular features of the technique, at present employed by him: The pelvis should be raised rather high, so that the intestines will slip upward out of the way. To aid this condition he does not hesitate to shake the abdomen. He emphasizes the advantage of application of Esmarch bandages to both thighs as a preliminary procedure. Without this, by raising the pelvis high, too much blood may be sent down into the region of the heart. Instead of stretching the first circle of the rubber tube very tight, he prefers winding of the tube around the waistline more often. At the time of writing, he had employed his method more than 200 times, including two patients with cardiac lesions. Zur Verth sug-

gests that an unnecessary and harmful degree of constriction could be avoided by the use of an accurate pulse controling apparatus on the femoral artery. In this article the interesting fact is noted, that by the exclusion of a large portion of the body from circulation, Momburg's belt distinctly lessens the amount of the narcotic necessary to obtain and maintain a complete general anesthesia.

For how long a time can aortic compression be exercised without detriment? Momburg himself used it up to 45 minutes. Engelmann placed the bandage on the same patient three times in short succession, leaving it in position during the total time of one hour and 45 minutes. Sigwart in one instance left the belt for two and a half hours without noticeable harm. Gerster thinks that the constriction could safely be continued for three hours.

The chief dangers of Momburg's method obviously lie in the possible harmful mechanical effect exerted by the tight constriction upon the intestines, large blood-vessels, ureters, etc., and in the alteration of blood-pressure caused by the sudden elimination of a large part of the circulation.

Amberger records the following case: The belt was applied to an aged and infirm man who had to be operated for a lacerated femoral artery. The patient collapsed when the belt was removed. Autopsy showed stasis hemorrhages in the pleura, edema in the lungs and some fluid in the pericardium. These evidences of severe congestion in the upper part of the body in his opinion must be ascribed to the action of the constricting tube.

In a case reported by Burk (a woman operated for a vulvar fibroma) the pulse remained good during and immediately after the operation. About an hour later the pulse became imperceptible. Saline infusion with adrenalin brought some improvement. The patient died next day with symptoms of peritonitis. Autopsy revealed small patches of gangrene in the small intestines which had led to the peritonitis. Circular strips of suffusion in the walls of some loops of the small intestines were unmistakable signs of direct strangulation. He ascribes the unfortunate result in this particular case to the fact that the patient was very thin and debilitated. Burk concludes logically that Momburg's belt should not be used on very thin patients or when there is present or suspected an ulcerated or chronic inflammatory condition of the intestines. This writer refers to an observation recorded by Pagenstecher of an ischemic paralysis of the distal end of the spinal cord subsequent to belt constriction.

Kupferberg mentions a death resulting from a hematoma caused by the tear of the intima of a large bloodvessel.

Gross and Binet quote the following ill effects of constriction: a case of Willems in which blood issued from the mouth of a patient after the use of belt-constriction; a case of Guinard of blood stained sputum; an intestinal hemorrhage observed by Pieri; a gangrene of the thigh seen by Kempf, and a fatality possibly due to constriction recorded by De Bovis. Duehrssen made two vaginal hysterectomies under belt constriction, in both instances the belt having been applied by Momburg himself, and lost one of these patients from an embolism, in his belief caused by an injury to the intima of one of the larger abdominal bloodvessels. He, therefore, warns against the use of waistline constriction in an article dealing with vaginal Cæsarean section, while considering the means of controlling the hemorrhage during this particular operation.

In a case of Ordonez of severe post-partum hemorrhage 25 minutes after the application of the belt the pulse became small and extremely fast. The patient became cyanotic, pupils dilated and, therefore, the belt was removed quickly.

There is one more fatality on record, and it may be stated that in a rather careful search of the literature no other accounts of death or serious accidents, ascribed to the method, have been found outside of those already quoted. Gross and Binet applied the tube to prevent serious hemorrhage during a disarticulation of a hip. A minute after the tube was removed the patient collapsed. Autopsy showed acute distention of the heart, undoubtedly favored by an unsuspected fatty degeneration of the cardiac muscle and an old mitral and aortic endocarditis. Sigwart had occasion to perform autopsies on two patients who died from post-partum hemorrhages in spite of the use of Momburg's belt. In both cases absolutely no signs of a harmful effect of the constriction upon the abdominal organs could be detected.

The present better understanding of the possible harm of waistline constriction in certain patients under certain conditions is the result of the forementioned autopsies and large series of interesting experiments. Carere's experiments on dogs showed that no permanent disturbances resulted from the constriction. Invariably there was found, however, a tendency to paralysis of the legs, but it always retrogressed sooner or later according to the technique applied. When the rubber tube was more than one and a half inch in diameter, serious injury to abdominal organs was occasionally observed, but when Momburg's technique was followed strictly the disturbances were only transient. Tornai experimented on young persons with normal nervous system and either normal hearts or well compensated cardiac lesions. In every case the number of systoles and the blood-pressure were notably increased. When the belt was removed the pulse grew weaker, in some cases becoming very weak and irregular. His experience emphasizes the necessity of a careful examination of the functional capacity of the heart beforehand, testing it by the Katzenstein or some other reliable method. Any suspicion of heart disease or arteriosclerosis, exophthalmic goitre, nephritis or plethora, in his opinion, should be considered a contraindication against the use of this method. Investigations made by Matas on young men led him to the conclusion that in cases of weak hearts the method is liable to fail. Instead of the usual increase in blood-pressure, there will be a fall and this in his opinion, indicates an inability on the part of the heart to keep up. In strong and robust individuals the method will be of great benefit and free of harm. Of greatest interest and practical importance are the experiments made by Frankl. He found rabbits unsuitable for these investigations because in them, very unlike to the conditions in man, both vena cava and aorta lie well protected between two large muscles. Large dogs prove more valuable in these studies, although in them the aorta is better protected against compression by the overlying intestines than in the human. In general Frankl confirms the reports of other experimenters to the effect, that intestines, peritoneum, the mesentery, etc., are not harmed by the pressure. He studied in particular the effect upon the endothelium of the larger blood-vessels, but found distinct lesions only in a rabbit, constricted for two hours. In this instance the vena cava contained a large thrombus, an observation of some interest in relation of the report of Duehrssen, already referred to, of an embolism subsequent to the application of Momburg's belt. Frankl found, that

respiration during constriction becomes faster, because the diaphragm is impaired in its excursions, it being pushed high up. The heart also is pushed up and turned, the apex lying higher and more to the left. He suggests, that in the case of the woman immediately after delivery, on account of the relaxation of the abdominal walls, the required amount of constriction probably can be obtained without this effect upon either diaphragm or heart.

A most important question is that of the change in blood-pressure. Mention has already been made of the advice given by Momburg to apply Esmarch's bandage around both thighs before the patient is placed into Trendelenburg's posture, preceding the application of the belt. Momburg attempts in this manner to avoid a dangerous rise in blood-pressure. Frankl found that this rise probably is chiefly due to the Trendelenburg posture itself. If the belt was applied in the flat horizontal position, the blood-pressure remained practically unchanged, with but a slight fall, when the belt was loosened. Therefore, those special precautions described above, which should be taken at the time when the contriction is released, seem necessary only when the belt was applied with the patient in the pelvic elevated position. These points are of special importance in view of the fact, that they forcibly prove the particular fitness of Momburg's method in obstetrical work. While in surgical work the procedure mostly is used in an attempt to produce an anemia during an operation, and thus the Trendelenburg position becomes an essential factor in the procedure, the obstetrician will find this new method of greatest value as a means of checking promptly a profuse uterine hemorrhage. Indeed, it seems that the method has been most often and most successfully employed in cases of serious post-partum hemorrhages. Under these conditions the belt is applied on an exsanguinated, anemic patient. Experiments on exsanguinated dogs showed that the application of the belt proved dangerous because the heart would begin to beat empty, the constriction having eliminated a large portion of the already dangerously reduced quantity of blood from circulation through the heart. Experiments on such dogs showed that Trendelenburg position alone would not overcome this danger, but that a sufficient amount of blood could be sent to the heart, if both lower extremities were bandaged from the toes up to the thighs preceding constriction. Frankl concludes that the obstetrician when dealing with exsanguinated patients should resort to Trendelenburg's posture in fairly anemic patients, but carefully bandage both extremities with elastic bandages from the toes up, whenever the anemia is of a serious character.

This very important point raised by Frankl concerning proper consideration of the degree of anemia, in the opinion of Stolz, probably explains his own failure with Momburg's method in a case of extreme anemia as the result of a ruptured tubal pregnancy. He employed the customary surgical technique of constriction, and the patient collapsed immediately, so that the belt had to be removed. It is only fair to assume, that the unfavorable experiences of others in the past will be avoided in the future by the general acceptance of Frankl's teachings.

Of interest in this connection is an observation of Ehrlich concerning the effect of the belt on the patient's temperature. He applied the belt to arrest a hemorrhage resulting from an injury to the groin. The tube was left in place for 32 minutes. The temperature had fallen to 35.2 C., and did not return to normal for 5 hours. This experience induced him to experiment on animals. He came to the conclusion that motor

and chemical insufficiency of the musculature cut out from circulation leads to a marked disturbance in heat production. In his opinion, this observation calls for special care in the application of the belt on very anemic patients, another point of special interest to the obstetrician.

In obstetrical practice, as repeatedly mentioned, the belt most often is applied soon after delivery. The abdominal walls are relaxed and the suppression of the pulse in the femoral artery will be obtained with a comparatively smaller amount of constriction. Therefore, as a rule, the obstetrician less often will meet with an undesirable occurrence described by Popow, also mentioned by Hoehne. If the patient vomits during the constriction, the sudden stretching of the abdominal walls relieves the pressure on aorta and cava, obviously more on the more rigid aorta. Blood thus is permitted to rush through to the lower half of the body, but without the possibility of its return, and then the final effect is a sudden and very undesirable passive hyperemia with an exaggeration of the hemorrhage. In the same manner an occasional failure of constriction can be explained when the bandage is applied not tight enough. The arterial blood will pass under it but the venous return flow may be obstructed.

On the other hand, the obstetrician will be more concerned with the possible harmful effect of belt constriction upon the kidneys as described by Hoehne. He observed that there was no urine passing down into the bladder during the constriction, and that the first urine obtained after the removal of the belt contained albumen. The temporary compression of both ureters undoubtedly affects the kidneys and the possibility of serious damage during a long constriction should be taken into consideration. Hoehne in this paper, suggests a method of constricting only one ureter by means of the Momburg belt for the purpose of examining the urine coming from the other kidney.

Hoehne also attempted to interrupt a pregnancy by means of belt constriction. He failed. His intention was to asphyxiate the fetus. Most writers also emphasize the peculiar fact that the constriction, with comparatively rare exceptions, causes strong uterine contractions, thus adding an important factor in the control of post-partum hemorrhage. Weber applied the belt in cases of profuse hemorrhages due to a retained placenta, and saw the placenta expelled spontaneously within 15 minutes without any further loss of blood. If necessary, in such cases of atonic hemorrhages, during the constriction, the placenta can be removed manually without hemorrhage. At times, however, a firm contraction of the uterus occurs only when the belt is removed.

The belt has proved extremely satisfactory, according to a report of Seitz, in 15 cases of placenta previa treated by means of vaginal hysterotomy. All mothers recovered and of the 10 children living at the time of operation 9 were saved. In his belief these splendid results are due to the fact that the belt permits a slow and careful operation. Sigwart thinks that vaginal Cæsarean section for placenta previa has been abandoned on account of the danger of serious hemorrhage. This danger now is safely obviated by the use of the constricting belt. He performed the operation twice successfully for placenta previa.

A paper of Ilmer enumerates the various conditions in which Momburg's belt has been used more or less successfully by obstetricians and gynecologists. Thus this method has been employed in a case of severe hemorrhage after a vaginal myomectomy, also after another vaginal operation when a ligature had slipped off a stump. Mackenrodt made one

of his radical abdominal hysterectomies for uterine cancer under constriction with satisfactory result. The belt has been extensively used in various forms of atonic hemorrhage after delivery. In cases of deep cervical tears constriction not only checked at once the hemorrhage, but permitted careful preparation for a suture of the tear, which can be done especially satisfactorily during this stage of local anemia. In other hemorrhages time can be gained for other measures, *e. g.,* for proper preparations for intra-uterine douche or packing; for thorough disinfection of patient and operator; or for a safe transport of the patient to a hospital. The belt may prove lifesaving in a case of premature detachment of the placenta, and will facilitate the management of cases of placenta previa. Immediate extraction after version is desirable in the interest of the child, but usually is omitted for fear of a cervical tear. The belt, as pointed out, greatly eliminates the danger of the cervical tear. The belt, as already mentioned, renders vaginal Cæsarean section comparatively safe for cases of placenta previa. The belt has been used in uterine rupture and in instances of serious hemorrhages due to hemophilia. In patients suffering from valvular lesions the belt applied immediately after the expulsion of the fetus will compensate the sudden, dangerous fall of the intra-abdominal pressure. Liepman has resorted to Momburg's belt in a case of excessive anemia after placenta previa, for the purpose of an autotransfusion while getting ready for a hypodermoclysis. The lower extremities were bandaged from the toes up, and then the belt applied to supply temporailry the heart with a sufficient amount of blood.

The method of waistline constriction in the light of all recent literature is one of the most advantageous and effective therapeutic measures at the disposal of the obstetrician, when dealing with serious hemorrhages. Its procedure is simple, its effect prompt,—the two main advantages in obstetrical work. Even if the effect is only temporary, sufficient time can be gained for the careful preparation of other means of controling a hemorrhage. The obstetrical patient offers unusually favorable conditions for the procedure: her abdominal wall is relaxed, her more or less anemic condition usually eliminates the danger of the sudden rise of blood-pressure incident to constriction. Frankl's investigations of this particular feature of belt constriction promise to preclude any disastrous effects at least in obstetrical practice. The method can and should be used by the general practitioner, but not indiscriminately. It is not free from dangers; these dangers, however, will count naught in those desperate obstetrical hemorrhages in which the belt offers the one reliable and ready means of checking the flow of blood promptly before life is extinct.

TREATMENT OF PROSTATIC HYPERTROPHY.

A REVIEW OF RECENT LITERATURE.

By JOHN R. CAULK, M. D., of the Editorial Staff.

1. Alexander: Prostatectomy. (*New York Med. Journ.,* February 8th, 1896.)
2. Belfield: Operations on the Enlarged Prostate. (*Amer. Jour. of Med. Sciences,* Vol. 100, November, 1890.)
3. Bottini: Galvano-Cautery Operation. (*Archiv. fuer klin. Chir.,* Vol. XXI., p. 1, 1877.)
4. Freudenberg: Die Chirurgische Behandlung der Prostata Hypertrophie. (*Wiener Klinik,* 1907.)
5. Freyer: Total Extirpation of the Prostate for Radical Cure of Enlargement of that Organ. (*British Med. Journ.,* July 20th, 1901.)
6. Fuller: The Question of Priority in the Adoption of the Method of Total Enucleation, Suprapubically of the Hypertrophied Prostate. (*Annals of Surgery,* Vol. 12, 1905.)
7. Goodfellow: Median Perineal Prostatectomy. (*Journ. Amer. Med. Assoc.,* Vol. 2, p. 104, 1904.)
8. White: Castration. (*Trans. Amer. Surg. Assoc.,* Vol. 22, p. 130, 1903.)
9. Young: A New Combined Electro-Cautery Incisor for the Bottini Operation for Prostatic Obstruction. (*Journ. Amer. Med. Assoc.,* January 11th, 1902.)
10. Young: Conservative Perineal Prostatectomy. (*Journ. Amer. Med. Assoc.,* Vol. 2, 1903.)
11. Young: Prostatic Median Bar Excisor. (*Trans. Amer. Assoc., of Genito-Urinary Surgeous,* 1909.)

Literature at present pulsates under hypertension from the numerous articles which have been injected into it for the treatment of prostatic hypertrophy. Even as far back as 1905 Socin collected 1,200 articles written on this subject. Since then many others have appeared. There is probably no other subject in surgery which has received more attention and no surgical malady which has shown greater advances in its treatment.

The treatment may be classified as palliative and radical. Under palliative are included prostatic massage, dilatations and catheterism. The radical comprises the various operative procedures which have been proposed.

Prostatic massage is often of benefit for a time in beginning hypertrophies if associated with some chronic prostatitis, but sooner or later it will fail and other measures will be necessary. Dilatations of the urethra have been abandoned as they generally aggravate the condition, and, instead

of being a benefit, prove harmful. This type of case should be carefully watched and not allowed to develop conditions which will add to the gravity of an operation.

Catheter life, which was unfortunately about the only resort of our ancestors, and which we are sorry to say is still advised by some practitioners,—just why, no one seems to know,—should not in the light of our brilliant operative results be recommended except under certain limited conditions, the principal one being as a preliminary measure to prostatectomy. Its use in this respect cannot be too strongly urged as it has been the life-saver to a great number of patients, and has put prostatectomy on a much safer foundation.

As to a permanent catheter life, except in patients who are absolutely unable to stand an operation, and they are very few, we should avoid it. The patients are sure to develop a cystitis, no matter how scrupulously cleanly and aseptic is our technique. Then catheterization becomes frequent, painful and an incessant nuisance to the patient, causing trauma to the urethra, susceptibility to vesical calculus and great liability to the infection of the kidneys with its resulting seriousness. At best, these patients are very miserable and are constantly hampered by the awful presence of the catheter. Furthermore, the duration of a catheter life is not long and then the mortality is higher than prostatectomy. Rosving reports ten deaths in 126 cases treated by catheter life. The best catheter to use in cases of prostatic obstruction is the coudé (Porgès). A straight soft rubber catheter should not be used, as it usually butts against the obstruction and causes traumatism; and occurrence that often explains the urethral chills that follow catheterization.

The surgical measures dealing with prostatic hypertrophy have been very numerous but at present it is generally a question either of the perineal or the suprapubic prostatectomy.

In 1856 Mercier first removed a prostatic middle lobe through the perineum. Billroth in 1867 did the first radical removal of the prostate, then in 1876 Bottini introduced his galvano-cautery operation through the urethra. Belfield was the first to do a suprapubic prostatectomy in 1866. Goodfellow in 1890 began the first well-systemized removal of the gland through the perineum. White in 1893 proposed castration and in the same year Reginald Harrison brought forward vasectomy. Of the early operations, the one of Bottini was the most important.

The technique of the operation is more or less familiar to all and will not be described. The instruments have been modified and improved. Freudenberg's instrument has been most generally used and has been modified by Young, in order to have different-sized blades according to the size of the prostate. Chetwood's instrument is designed to operate through the perineum instead of the urethra. The Bottini operation has found its best field in the cases of medium bar formation, sclerotic prostates, the so-called contracture of the neck of the bladder. In large intravesical hypertrophies, the results have not been as satisfactory. The prostate continues to grow, the obstruction soon returns. The dangers of the operation are considerable. It is more or less a blind procedure; and the danger of burning in the rectum, of the blade slipping into the urethra, particularly the old style with the obtuse angle, coupled with the high mortality, have relegated the operation to the rear.

Castration spread like a pandemic of la grippe for a time, but the results were not encouraging and the mortality unfortunately high. Vasectomy has never won popularity.

Suprapubic Prostatectomy.—In 1827 Amusatt, during an operation for vesical calculus, removed a portion of the prostate suprapubically. In 1885 Dittel carried it out as a routine for prostatic obstruction, but the first definite suprapubic prostatectomy was done by Belfield in 1886 and in the next year McGill followed along the same line.

The first complete suprapubic prostatectomy was done in 1894 by Eugene Fuller, although Freyer is wrongly considered by many to have been the first. He has perfected the operation and has always been the representative of this method. At first the operation of Fuller was done without the aid of the fingers in the rectum, the prostate being pressed up by the fist against the perineum. The modification of the operation by putting the fingers in the rectum was brought out by Guiteras in 1900, and it has greatly assisted in improving the operation. Fuller's operation consisted also in supplying perineal drainage and closing the suprapubic incision. Freyer, who drains suprapubically with a large ⅞-inch tube, does not pack the prostatic cavity and does not suture the bladder. Deaver, a great advocate of the suprapubic method, opens the bladder widely to expose the interior, uses a smaller drainage tube, usually packs the prostatic cavity with gauze, and sutures the margins of the mucous membrane around the cavity over the packing. He says that the ejaculatory ducts and urethra are almost always torn. The suprapubic operation is an excellent operation and is very popular with many operators. It is an operation that is done more or less blindly, as the prostatic cavity has to be drained uphill through the bladder which is often infected; and the patients are required to stay in bed longer than after the perineal method, thereby running the danger of a hypostatic pneumonia, and as a rule retarding their progress in graining strength after the operation. The ejaculatory ducts and urethra are liable to be injured and the mortality, according to Freyer's statistics which are the best, is 7.5 per cent.

Perineal Prostatectomy.—Many references among the early literature are made of the removal of the prostate, or parts of the prostate through the perineum. Covillard in 1639 was one of the first to remove a hypertrophied middle lobe during the course of a perineal lithotomy. Billroth in 1857 was the first to remove intentionally the prostate through the perineum. Goodfellow was the first to make the operation a success. He used a medin perineal incision and exerted counterpressure suprapubically. In 1896 Alexander advocated suprapubic incision to push the prostate down toward the perineum to assist in its enucleation. In 1899 Bryson suggested cutting down to the bladder but not opening it, and pushing the prostate down from above. Then came the making of perineal operation, which consisted in getting something in the urethra or bladder in order to exert traction and pull the prostate down. It started with the rubber balloon of Syms, the desenclaveurs of Delbet and Albarran, and later with the tractors of Young and Lydston. The instrument of Young is the one almost entirely used in this country.

The perineal operation through median incision and without a tractor was a blind operation, uncertain in its results and dangerous in its complication. In 1903, Young brought out his method of conservative perineal prostatectomy, and through him, it has been greatly perfected. Instead of being an operation with a high mortality and many complications it has become one of an exceedingly low mortality and practically no serious complications. In his last report of 400 cases—patients varying in age from fifty to eighty-eight—the majority were in the hospital under

four weeks after the operation: 1 only six days, 8 under two weeks. The fistula closed as follows:—

22 per cent. within two weeks; 50 per cent. in 21 days; 8 cases within a week, and two cases on the fourth day. Practically all these cases were out of bed and walking on the third day, tubes and gauze having been removed on the second. As to the functional results, in answers to letters sent to the patients, 85 per cent. replied that they had been absolutely cured, the remainder, with a very few exceptions, stated that they were greatly improved. There were but 2 cases incontinence following the operation, and the operations on these two were atypical. One was a very old man, greatly depleted, on whom a previous suprapubic operation had been attempted, and the operator would not remove the prostate on account of its great size. The perineal operation was done very hurriedly and the usual care was not observed. This patient was able to retain his urine while lying down and did not wet his bed, but on moving about there was dribbling. The second case during the manipulation had the ejaculatory bridge and urethra torn, the lateral lobes were removed separately, the median lobe was removed after dividing the urethra transversely just in front of the median lobe and stripping it up anteriorally and posteriorally. The prostatic orifice was greatly dilated and irregular, and was sutured around the tube with catgut. This patient does not wet his bed and occasionally can hold his urine all night, but dribbles at times when on his feet. Often, however, he can hold his urine four hours; so if one is careful to preserve the floor of the urethra and is painstaking in the removal of the gland, incontinence should be a rare complication.

The writer recently saw an article in a journal in which a surgeon said he had never seen the ejaculatory ducts and the urethra preserved. This is surely not in accordance with the best statistics of perineal prostatectomy.

There was only one case with a persistent recto-urethral fistula, several rectal injuries having been made during the operation but these were properly cared for and healed. If the rectum should be injured, a suprapubic drainage should be done to divert the stream.

As to the effects of perineal prostatectomy on the sexual powers, the writer sent, under Dr. Young's instructions, letters to all the cases, and their answers were most encouraging. Of 76 patients who had had normal erections and intercourse before operation, 39 answered that they were perfectly normal afterward. 5 had normal erections but had not attempted intercourse; in 10 the erections were impaired, but fairly satisfactory; in 9 erections were impaired and coitus impossible; in 13 erections had not returned. The cases that had impaired erections before operation showed about the same post-operative results as above. Of the cases that could not have coitus, on account of imperfect erections prior to the operation, one has a return of normal erections and indulges satisfactorily in intercourse. 48 cases had complete loss of sexual power before operation; of these, 2 have had normal erections since; 8 have had partial erections; in 38, erections have not returned. The percentage of mortality of these cases is 3.2. The causes of death were variable, pneumonia, myocarditis, apolexy, pyonephrosis, spinal cord lesions, acute edema of the lungs, and secondary suprapubic for stone, etc.

The success of these cases other than a skilled operation is due to a preliminary preparation, such as getting the kidneys in good shape and building the patient up generally, and proper attention after operation,

which consists in continuous irrigation for twenty-four hours, abundance of water, infusion immediately after operation, careful attention to the bowels, never using enemas (two cases of pulmonary embolism followed the use of an enema), getting the patient up and moving about soon, and not tampering with the urethra. Sounds should not be passed, stricture being the rarest sort of a complication.

In 1909, before the American Association of Genito-Urinary Surgeons, Young presented two new instruments for the treatment of early hypertrophies—the median bar excisor and the operative cystoscope. The former has its special field of usefulness in median bar formation, vesical neck contractures, but should not be used where there is any lateral involvement. The latter has an occasional service in pedunculated middle lobes. The results of these operations in cases with median bars associated with small amounts of residual urine, increased frequency of urination, some difficulty and hesitancy,—in other words, signs of beginning obstruction, have been most encouraging and have saved numbers of patients from major operations. The operation can be done under local anesthesia. It is best for the patient to lie up for about a week, and for the first twenty-four hours to have a continuous irrigation in order to prevent clotting and to check hemorrhage, which is sometimes brisk but never alarming.

In all cases of prostatic obstruction, a preliminary cystoscopic examination should be done in order to determine the true condition of affairs. It is particularly essential in these cases, because the operation is useless and harmful if there is any lateral involvement.

RECENT TENDENCIES IN OPHTHALMIC THERAPY.

A REVIEW OF RECENT LITERATURE.

By JOHN GREEN, JR., M. D., of the Editorial Staff.

1. Daxenberger: Collargol in the Treatment of Eye Diseases. (*Wochenschr. f. Ther. u. Hyg. d. Aug.,* June 23d, 1910.)
2. Bondi: The Therapeutic Value of Sophol. (*Zeitschr. f. Augenheilk.,* June, 1909.)
3. Davis: The Treatment of the Eye when the Globe is Infected with the Object of Preventing Panophthalmitis. (*Trans. Amer. Ophthal. Soc.,* Vol. XII., Part I., 1909.)
4. Fukala: A Method of Rendering the Eyeball Completely Anesthetic in Cataract and Glaucoma Operations. (*Canada Lancet,* May, 1910.)
5. Farnarier: Acoin Oil as an Analgesic in the Treatment of Trachoma. (*La Clinique Ophtalm.,* April 10th, 1910.)
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8. Gemmill: Rodent Ulcer Treated by Potassium Bichromate. (*Brit. Med. Jour.,* October 23d, 1909.)
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14. Jadin: On the Use of Thiosinamine in Some Diseases of the Optic Nerve and Retina. (*Zeitschr. f. Augenheilk.,* September, 1909.)
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17. Davidson: Radium and Some of its Physical Properties. (*Bristol Medico-Chir. Jour.,* March, 1910.)
18. Wirtz: Further Clinical Experience with the Ionization Treatment of Eye Diseases. (*Klin. Monatsbl. f. Augenheilk.,* July, 1909.)

19. Zahn: Experimental and Clinical Experiences with Ionic Medication. (*Klin. Monatsbl. f. Augenheilk.,* January, 1910.)
20. Orloff: Bier's Method in the Treatment of Spring Catarrh. (*La Clinique Ophtalm.,* November 10th, 1909.)
21. Perlman: On the Employment of Steam in Ophthalmology. (*Klin. Monatsbl. f. Augenheilk.,* May-June, 1910.)
22. Hesse: Eyebaths. (*Wochenschr. f. Ther. u. Hyg. d. Aug.,* February 3rd, 1910.)
23. Thomas and Fisher: Relief of Glaucoma Through Subconjunctival Injections of Sodium Citrate. (*Annals of Ophthalm.,* January 1st, 1910.)
24. Heller: Three Cases of Acute Glaucoma Treated with Subconjunctival Injections of Sodium Citrate. (*Annals of Ophthalm.,* October, 1910.)
25. Happe: On the Supposed Tension Lowering Action of Subconjunctival Injections of Sodium Citrate in Glaucoma. (*Arch. f. Vergleichende Ophthalm.,* Br. 1, Heft. 3, 1910.)
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27. Wandless: Mydriatics and Miotics in Injuries of the Lens. (*Arch. of Ophthalm.,* May, 1910.)
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33. Dor: The Treatment of Retinal Detachment by Tuberculin. (*La Clinique Ophtalm.,* August 10th, 1910.)
34. Shumway: Treatment of Gonorrheal Iritis or Arthritis by Vaccines. (*Trans. Amer. Ophthal. Soc.,* 1910.)

The purpose of the present paper is to present to the practitioner a review of recent additions to the therapeutic equipment of the ophthalmologist and new applications of existing ophthalmic drugs and therapeutic methods. The editor has surveyed the literature of ophthalmic therapeutics of the past twelve months and has tried to select for review only such suggestions as seemed to be of value. For the sake of ready reference, the name of the drug or method is indicated in a subhead.

Collargol.—Daxenberger's experience with this silver preparation has been altogether favorable. Its efficacy in inflammatory diseases of the anterior segment is well known, *e. g.,* severe conjunctivitis, dacryocystitis, and ulcus serpens. After evacuation of hypopion in ulcus serpens, Daxenberger injects a few drops of a ½ per cent. solution into the anterior chamber and also advocates an intravitreous injection (of the same strength) in all cases of impending panophthalmitis.

Sophol.—This albuminate contains 20 per cent. of silver in "masked" form; *i. e.,* it cannot be detected by the usual reagents. Bondi has found that in 5 per cent. to 10 per cent. solutions it is well borne by the tissues, has no cauterant action and is useful in superficial bacterial invasions.

Argyrol.—In four cases of impending panophthalmitis, Davis prevented the full development of the disease by injecting 10 to 20 per cent. argyrol into the anterior chamber after the evacuation of the pus.

Complete Anesthesia.—Dissatisfied with the degree of local anesthesia in cataract and glaucoma operations especially as regards the anesthesia of the iris, Fukala sought to find a means whereby the eyeball could be rendered completely insensitive. This result he has attained by the subconjunctival injection of a 15 per cent solution of cocaine, to which is added adrenaline. After 15 minutes the eyeball is completely insensitive. The method should not be used in children up to 15 years, in marasmus and in severe heart affections.

Acoin Oil.—To obviate the pain incident to the use of copper sulphate crayon in the treatment of trachomatous granulations, Farnarier applies a 1 per cent oily solution of acoin to the palpebral conjunctiva after the application of the crystal. The reviewer can warmly recommend this suggestion.

Salicylic Acid-Resorcin in Alcohol.—The formula recommended by Ewing consists essentially of resorcin 40 grains, salicylic acid, one ounce, dissolved in alcohol 95 per cent., four ounces. This he has used in pannus, fascicular and dendritic keratitis and ulcus serpens with much satisfaction. But it is mainly in lid epitheliomata that the solution seems to have its greatest use. Teased into the ulcerated surface of lid cancers it has been found to destroy all trace of the malignant tissue. After the surface has been thus cleaned, granulation tissue soon replaces the cancer and a smooth pliable scar forms. In the treatment of epithelial growths, Ewing directs that the solution should be applied to the surface on the end of a cotton wound tooth pick and teased into the surface until the capillaries become brown or black. This is repeated daily or every second day until all epithelial tissue is destroyed and the floor and margins of the ulcer are covered with normal healthy granulation tissue.

In the second report, Ewing relates experiences with the solution in inoperable cancer in other portions of the body in which it was found to have deodorizing and other beneficial effects. In three cases of perforating ulcus serpens, "good" corneas were saved. A thickened corneal staphyloma was destroyed in five applications leaving the cornea of nearly normal curvature.

Potassium Bichromate.—A 10 per cent. aqueous solution of potassium bichromate was used by Gemmill as an application to a rodent ulcer over the bony part of the nose. Three series of applications was followed by rapid healing leaving finally an irregular pitted scar.

Picric Acid.—Cecchetto confirms the good results obtained by Fortunati and Valenti from the use of a 2 per cent. picric acid ointment in eczematous blepharo-conjunctivitis, lime burns, traumatic keratitis and in particular, ulcus serpens. The microörganisms quickly disappear, hypopyon resorbs and healing occurs with the smallest possible scar.

Jequirity.—Small gelatine disks of jequiritine prepared by Zambelletti have given Rampoldi good results in several cases of epithelioma of the face and eyelids.

Pyocyanase.—Pyocyanase, which is a brown fluid prepared from bouillon cultures of B. pyocyaneus, has been used by Bronner in 6 cases of hypopyon keratitis. A 50 per cent. solution dropped into the eye every hour is followed by prompt disappearance of pain. The ulcer is said to heal more quickly and with less opacity than when classical methods are used. Atropine and hot formentations were additional means of treatment.

A similar estimate of this preparation has been formed by Arens.

Fibrolysin.—Ophthalmic opinion seems to be utterly divided as to the usefulness of thiosinamine and fibrolysin in ophthalmic therapy. Cauvin reports two cases of long standing simple stricture of the nasal duct in which annoying lacrimation was greatly relieved. Wecker's hollow sound is introduced and allowed to remain fifteen minutes in *situ*. The duct is then flushed with water by means of a lachrymal syringe, the tip of which is inserted into the sound. The syringe is filled with 2 c.c. fibrolysin and the duct flushed therewith as the hollow probe is slowly withdrawn. One case was cured after two injections, the other after one. Both had failed to yield to a long course of probing.

Jadin made a special investigation into the possibilities of thiosinamine therapy in diseases of the optic nerve and retina. 30 to 40 injections in the back of a ⅓ Pravaz syringeful of a 10 per cent. solution of thiosinamine in water and glycerine were made on alternate days. Five cases of tabetic atrophy and eight cases of optic atrophy of unknown origin were either not benefited or made worse. Retinitis pigmentosa was unaffected and acute neuritis was made worse. The same was true of retrobulbar neuritis and retinitis proliferans.

Thillier relates a case of retinal hemorrhages, improving at first under mercury, but later relapsing so that vision was reduced to perception of large objects and the media were blocked. At this point 2 c.c. fibrolysin 0.10 per cent. solution was injected into the gluteal muscles. A second injection two days later, was followed in four days by such marked improvement that the patient was able to tell the time of a watch. After ten injections vision was ⅙ and the fundus was visible. At the time the case history ends the vision had risen to ⅓ with the future, as the author prudently remarks, "in doubt."

Radium.—Abbé, in the course of a general paper on the effect of radium in surgery relates the following experience of interest in connection with ophthalmology. A forty-five year-old male presented a sarcoma involving the lower lid and adjacent conjunctiva and skin. The tumor had resisted treatment with rays. Strong raidum was applied four times in the course of a single week. Week by week the growth melted away and finally completely disappeared. No recurrence in five years. Well may Abbé remark: "Nothing so nearly resembling the marvelous has ever been my fortune to see in surgical work." Davidson uses radium bromide in sealed glass tubes, thus utilizing the *gamma*, most of the *beta* but none of the *alpha* rays. He reports favorable results (mostly definitive cures) in tuberculosa verrucosa, recurrent carcinoma and rodent ulcer of the eyelid. In hypopion ulcer, corneal ulcers generally, episcleritis and pterygium, radium has, according to Davidson "yielded results superior to any other known form of treatment."

Ionization Treatment.—Wirtz, on the basis of a considerable clinical experience with ionization treatment, is favorably impressed with the results. He has used zinc electrolysis in the treatment of corneal ulcer due to pneumococci, diplobacilli, staphylococci, etc. The ions penetrate into the depths of the tissue and exert a powerful antiseptic action. The current used is 3 to 5 milliamperes, of three to five minutes duration given in from four to twelve sittings. In 10 cases of interstitial keratitis treatment with iodine ions yielded excellent results. Improvement was noted in 21 out of 26 cases of corneal opacity treated by chlorine ionization. A bad case of syphilitic iridocyclitis, vision reduced to p. l. and a case of scleritis of doubtful etiology yielded to mercury ionization. Zahn experimented with ionic medication in animals. He found that zinc is

a powerful caustic, destroying in mild doses the epithelium and in larger doses the deeper tissues of the cornea. The first results is a necrosis and shedding of the epithelium and thinning of the corneal tissue. Twenty-four hours later the epithelium has disappeared and the cornea is swollen and edematous. Chlorine and iodine possess only a superficial action. Zinc ionization was found to be highly beneficial in most cases of pneumococcal ulcer, diplobacillary, simple and dendritic ulcers and ulcerative blepharitis.

Bier's Hyperemia.—Orloff reports the cure of a case of vernal conjunctivitis by means of Bier's hyperemia induced by means of Noge's clamp forceps.

Steam.—Perlman declares that steam used according to his method, favorably influences nutrition, alleviates pain, promotes the formation of pus in virulent affections of the lids and lacrimal sac and prepares the conjunctiva in chronic catarrh for the energetic action of astringent collyria, at the same time diminishing their irritative effect. His apparatus allows steam to escape through two pipes, the mouths of which are funnel shaped and covered with wire netting. The patient approaches them as near as is possible without discomfort and keeps his eyes open or shut according to the disease or the required intensity of effect. Sittings last ten to fifteen minutes and are repeated three to four times each day.

Eyebaths.—According to Hesse eyebaths, by which is meant douching of the open eye by means of a solution contained in an eyecup, cleanses, promotes lymphatic activity and has a special effect on bacteria. He uses a lukewarm solution of artificial Emser salt and biborate of soda.

Sodium Citrate.—The relief of glaucoma, or rather a reduction of increased tension in glaucoma by means of subconjunctival injections of a solution of sodium citrate is the proposal of Thomas and Fischer. The strength of the solution (the injection may be repeated) is 4.05 to 5.41 per cent. In the five cases reported the increased tension was lowered in every instance. Heller treated by this method three cases of acute glaucoma with strikingly favorable effect. For two hours following the injection the patient suffered an access of pain which then entirely disappeared coincident with a fall in tension. In one case, sight returned to what it was before the attack. Another effect commented upon by Heller is the marked deepening of the anterior chamber thereby simplyfying the ultimate performance of iridectomy.

The method has found a most severe critic in Happe who declares that in a research of this kind the determination of the tension by finger testing is not sufficiently delicate. By using refined tonometric methods Happe obtained the following results: in 17 cases thus treated, there occurred a slight lowering of tension in 2, but not so much as is frequently observed following the instillation of eserine; in 3 non-glaucomatous eyes and in 2 with absolute glaucoma no effect was produced; in the remaining 10 the tension was raised, probably from the irritation of the ciliary body and hypersecretion.

Alcohol Injections.—In a case of varix of the orbit pushing forward the outer half of the right lower eyelid, in which electrolysis had been tried without effect, three drops of alcohol were injected into the orbit. This was repeated (dosage slightly increased) in a week and again in 2 weeks. One week later the venous tumor had disappeared. Klinedinst assumes that the treatment set up a mild cellulitis or periphlebitis followed by thrombophlebitis and organizition of clots leading to the obliteration of veins.

Atropine and Eserine in Alternation.—A traumatic cataract with iritis under the influence of atropine and hot fomentations showed progressive

absorption for eight weeks so that vision with a plus 7 was 20/100, after which for seventeen days no further improvement took place. Alternate instillations of atropine and eserine were then employed, improvement began, and continued until vision became normal with a plus 12 lens. Wandless has also found the method of value after discissions and cataract extractions except when there is increased tension. Atropine should be given from one to three days four or five times daily, and then eserine instilled for one to three days or until the atropine is overcome.

Carbon Dioxide Snow.—For papilloma and rodent ulcer, Harman and Morton recommend one full application of the snow cylinder. For trachoma, brief and repeated applications have been found of service.

Serotherapy.—Deschamps report is based on the use of the Rosenthal-Berlioz antirheumatic serum in three cases of rheumatic iritis. 20 c.c. doses were injected on succeeding days followed by great improvement on the third day. But two of the patients developed serum rashes and the third became quite ill as an immediate consequence of the injection. The method appears to have only a limited application but may be used in addition to other methods of treatment.

Para Specific Serotherapy.—Whether or not we agree with the theoretical considerations advanced by Darier and others to explain the action of sera specific for one infection benefiting other infections of totally different origin, we must admit that clinical results seem to justify such a use. According to Verrey who has given, orally, dilute antidiphtheretic serum in cases of iritis, post operative infection and neuroretinitis, the results are excellent. Yvert attaches great merit to the method in acute infective iritis, and iridocyclitis whether due to rheumatism, tubercle, syphilis or traumatism. It may be used in addition to other methods in infective corneal ulcers, and in infected wounds of the cornea and sclerotic. The preferable method of administration is by the mouth. 10 c.c. of fresh serum mixed with milk is the usual dose. This may be repeated daily if necessary.

Acid Hydrobromate of Codein.—This drug, in a 2 per cent. aqueous solution has been found to have a profound lymphagogue action similar to dionin, but attended by less pain and chemosis. The effects disappear at the end of an hour.

Tuberculin in Retinal Detachment.—Dor has been led to use tuberculin in certain cases of retinal detachment on the assumption that the separation might be an initial and isolated manifestation of tubercle in patients who have no previous history of the disease. Dor reasons that, as non-vascularized or poorly vascularized tissue such as tendons, serous membranes, etc., are especially prone to tubercle, it is conceivable that the non-vascular vitreous may be thus attacked giving rise to shrinking of this tissue and consequent retinal detachment.

Five times in two years has Dor treated detachment with tuberculin (in addition to subconjunctival injections of sea water). Three cases were definitely cured while one had reattachment followed by relapse. As to the rôle played by the tuberculin, Dor asks the pertinent query, can anybody obtain reattachment four times out of five by subconjunctival injections alone?

Vaccine Treatment.—Using large doses (one hundred million gonococci), Shumway cured, in five weeks, a case of metastatic gonorrheal iritis and arthritis. Pain and photophobia disappeared after the first injection. Shumway states that in metastatic conditions the heterologous or stock vaccines are as efficacious as the homologous strain. The dosage varies from one to one hundred million, the larger doses being probably the best.

THE SURGERY OF CONGENITAL PYLORIC STENOSIS.

A REVIEW OF RECENT LITERATURE.

By Malvern B. Clopton, M. D., of the Editorial Staff.

1. Berend and Winternetz: Pylorus Intubation for Spasmodic Stenosis of the Pylorus in Infants. (*Jahrb. fuer. Kinderheilkunde,* Vol. LXXII., No. 2, p. 230, 1910.)
2. Bunts: Infantile Hypertrophic Stenosis of the Pylorus. (*Trans. of Amer. Surg. Assoc.,* Vol. XXVI., p. 226, 1908.)
3. Hutchinson, R.: Congenital Pyloric Stenosis. (*Brit. Med. Jour.,* p. 102, October 8, 1910.)
4. Nicoll: Congenital Hypertrophic Stenosis of the Pylorus. (*Practitioner,* Vol. LXXXV., No. 5, p. 659, 1910.)
5. Scudder: Congenital Stenosis of the Pylorus. (*Surg. Gyn. and Obst.,* Vol. XXI., No. 3, p. 275, 1910.)
6. Stillman: Hypertrophic Stenosis of the Pylorus in Infants. (*Jour. Amer. Med. Assoc.,* 1909.)

There have been numerous reports of isolated operative cases of congenital pyloric stenosis in the recent literature, which have a certain value, but they fail to make clear the treatment of this much-discussed subject, and lack the weight of argument that will settle the question of the proper method to pursue in this condition. Hutchinson, who relates his large experience with this disease, may be assumed as typifying the best of the medical opinions of a condition that is lately being much more frequently recognized; and a short review of his address may be a proper introduction to the subsequent reviews of the results which the operative interference has given in the hands of those who have seen the class of cases not benefited by strictly dietetic measures. It is curious that 80 per cent. of the cases are males, and a large proportion are first-born children. The vomiting, projectile in character, usually coming on soon after a feeding, does not make its appearance until after the second week, and there is a tendency to cease vomiting for some hours with any change of food, but it recurs again as violently as ever. At the outset, the vomiting is accompanied by constipation, which helps to distinguish it from dyspeptic vomiting in which diarrhea is usually present. The child loses weight, it becomes emaciated; the wasting, however, is not like that met in cachexia. The child is not anemic, but simply looks starved, and remains surprisingly bright in spite of it. The physical signs are a dilated stomach, which makes a swelling in the upper abdomen in striking contrast to the attenuation of the rest of the trunk. Waves of peristalsis are seen shortly after a feeding, and roll from left to right about the size of a golf ball, sometimes two or three being seen at once, and there is practically no pain. A pyloric tumor can sometimes be felt. The pathological features are an enormous development of the whole

pyloric canal, which forms a dense tube, the extremity of which (the tumor-like pylorus) projects into the duodenum. The mucous membrane is thrown into longitudinal folds, the ends of which project into the vestibule. Microscopically there is an increase in the number of fibres, and also each individual muscle fibre is broader, both in the longitudinal as well as in the circular layers. He believes that there are great difficulties in the way of accepting either the congenital hyperplasia or the spasm theory, whilst the compromise that there are both hyperplasia and spasm, has the difficulties of both combined. The prognosis in these cases he bases on his own observation of 20 cases, 17 of which were treated at home and all recovered without operation, 3 sent to the hospital where 2 died. He gives Huebner's record of 19 recoveries out of 21 cases treated medically, Stark's 11 out of 12, whilst of 6 cases reported by Block and not operated upon, all did well, and of Bendix's there were no fewer than 30 recoveries out of 32 cases treated by medical measures alone. His own cases are indisputable, as shown by reference to the clinical histories. In the hospital which he attends and where medical treatment only is followed, the mortality was 78 per cent. in a series of 64 cases. This great increase in the death-rate was due to the fact that the cases come in late when much exhausted, and that these babies seem to stand the condition of hospital life badly. Of the operative statistics he mentions Burghard's 11 recoveries out of 16 cases, and Cautley's 6 recoveries out of 7 cases operated upon in private, but a mortality of 4 out of 5 hospital cases. The estimate of Ibrahim of 50 per cent. mortality in operative cases is accepted as about correct. Furthermore, he states that such statistics do not do justice to the surgeon, for in many instances operations were only performed as a last resort, when the chances of recovery were small. In dietetic treatment lavage is necessary once or twice a day, according to the frequency of the vomiting. Peptonized diluted cow's milk, not necessarily fat free is used; 2 or 3 ounces being given at a feeding. Vomiting will stop soon, but the infant may not gain in weight for weeks, sometimes not until the fifth month. It is at this period that one's faith in the efficacy of the treatment is most sorely tried. Improvement finally sets in, and often quite suddenly the child gains in weight. In hospital cases, in spite of the cessation of vomiting and the consumption of a fair amount of food, the weight refuses to rise, and the child succembs to an "alimentary toxemia." The ultimate result of medical treatment has been observed in some cases five years after treatment, and the children were found perfectly normal and healthy. Some cases show evidence of obstruction, peristalsis and dilated stomach years later, and these cases have occasional stomach upsets. His position about operation is that it should never be recommended, although he believes that there may be some cases which would have been saved by operation that die without it, but he knows no method by which such cases can be recognized. It is suggested as a practical policy either to operate upon all cases in which the signs are well marked or upon none at all, for if you wait for five or six weeks to see if improvement will occur, the surgeon is called in when success is not likely, on account of the weakened condition.

Bunts considers congenital stenosis and infantile stenosis of decidedly different clinical significance. Congenital pyloric stenosis would in all cases call for very early operative interference. Infantile pyloric stenosis develops after birth and is often amenable to medical treatment, but in the absence of improvement an early operation offers an excellent prospect

of recovery. However, there does not seem to be as yet any positive way to distinguish between congenital and infantile forms. The earlier the symptoms the more probable the congenital form. In selecting cases pyloroplasty offers results superior to those of gastro-enterostomy and should be the operation of choice.

There has been no recent improvement in operative results, and the one great determining cause of death in practically all cases is delay. It is obvious that until this obstacle is removed by the medical attendant, little or no improvement of the present statistics can be effected.

In reviewing 114 cases Bunts found that the mortality figures were about the same as in the previous 89 cases reported by Thompson,—that is, that 53 per cent. of the cases died and this rate holds whether the operation was for divulsion, gastro-enterostomy or pyloroplasty. It seems surprising that an operation, seemingly so unsurgical in its methods and so unpromising as to its permanency as divulsion, should show the most favorable percentage of recoveries. This cannot be due alone to the smaller number of cases, for in this class we have 27 cases with a mortality of 51.8 per cent., while in pyloroplasty there are but 17 cases with a mortality of 53 per cent. There were 69 cases of gastro-enterostomy with 53 per cent. mortality. Aside from the inherent danger of operation upon the marasmic babes, the mortality from divulsion seems to have been due: first to failure to overcome the stenosis; secondly, to a rupture of the pylorus through the peritoneal coat; and thirdly, to hemorrhage. Pyloroplasty with a mortality slightly less than that of gastro-enterostomy would apparently be the operation of choice, and would accomplish in the safest, easiest, and most correct manner the relief sought. But this operation has been performed in but 17 cases. There must evidently be some other reason that the preconceived preference for gastro-enterostomy to account for the small number of pyloroplasty operations, and this reason seems to lie in the fact that operators have considered the hard, thickened, elongated, cartilaginous-feeling pylorus to be a barrier to its successful accomplishment. Dent has been an advocate of pyloroplasty, reporting 50 per cent. of recoveries in fourteen cases, and seems to consider the technical difficulties practically negligible. He uses a single row of Halsted sutures, which simplifies the operation very materially. Cautley is of the same opinion, and says that if the muscle is very thick and hard, a portion on each side can be snipped out before suturing. The reason that gastro-enterostomy has been performed more than four times as often as pyloroplasty and scarcely three times as often as divulsion, seems to be that most operators considered the chance of securing a successful result from pyloroplasty not very encouraging. The posterior method of gastro-enterostomy is more frequently used than the anterior, but it is suggested that the anastomosis can be made in front of the stomach with less handling of the tissues and with freer space for application of clamps, and with a better control over possible complications during the operation. The principal causes of death after pyloroplasty are marasmus and shock; while the causes of death after gastro-enterostomy are shock, convulsions, prolapse of gut and peritonitis.

Stillman reports on 27 cases which have been collected from the practice of physicians and surgeons along the Pacific Coast. Of these cases, 11 were operated on, of which 9 recovered. Of 16 treated medically, 9 recovered and 7 died. Of those recovering after operation all remained well and are healthy normal babies in appearance. Of those dying after operation, one died forty-eight hours after; the other after a second operation performed five days after the primary one, which was gastro-

duodenostomy and failed to relieve the vomiting. Of the 6 undoubted cases recovering under medical treatment, one at the age of five years is obliged to live on vegetable purees and milk meat-juice. One has been under treatment one month and ten days only. One at the age of five months weight 7½ pounds. Operation has been considered in this case, but not advised because mortality risk. Of the remaining cases one at the age of six months weighs 13½ pounds and one at seven months weighs 9¾ pounds. Of those dying under medical treatment, one died of pneumonia, one of sudden collapse three days of beginning treatment. The 11 cases treated surgically were operated on by several different surgeons. 7 of the cases operated had posterior gastro-enterostomy and one anterior. The case on which the gastro-duodenostomy was done would probably have recovered if originally the anastomosis had been made with the jejunum. Stillman believes that there is undoubtedly such a condition as pure pyloric spasm in infants as in adults, without demonstrable hypertrophy of the muscles. In these cases operation will do no good, as the spasm is apt to be secondary to trouble elsewhere in the abdomen and pelvis. The symptoms in these cases will begin after the first month and not start early as with true hypertrophy. He believes that the hard cartilaginous tumor will ultimately be found to be the result of congenital abnormality of development, and not the result of swallowing anything. This muscle tumor is capable of spasmodic contraction and the degree of spasm is not necessarily measured by the amount of hypertrophy. In two cases operated by Stillman no suggestion of lumen could be demonstrated by compressing the tumor. In four post-mortem specimens the same condition was noted, the lumen reduced to a tortuous passage one-half to three-quarters of an inch long, that would hardly admit a probe. He believes that a tumor should be made out in most cases before operation, particularly in those cases where an anesthetic is given.

Scudder in "The Study of the Effect of Gastro-Enterostomy upon Digestion and upon the Pyloric Tumor in Congenital Stenosis," gives a very complete article based upon his own experience and several other cases operated by others. He personally prefers a posterior gastro-enterostomy, and this is the operation which has been done in the cases he reports. 8 of the cases operated by him have been very carefully watched, 6 other cases are from other clinics. In every instance the pyloric tumor was palpated and inspected. Moreover, in every case the clinical course of the disease manifested itself as an obstruction at the pylorus and in all cases the baby was gradually starving to death. In considering the effect of gastro-enterostomy upon the metabolism of the body, he believes that in babies with congenital pyloric stenosis, ideal conditions are found for pursuing such an investigation. The object was to find whether or not the operation modified in any particular the digestion of fat, starch and protein. An elaborate system of experiments was determined on, and the facts bear evidence that the operation of gastro-enterostomy does not change the ultimate disposition of the food components, fat, starch, and protein, and clinically it is shown that all these babies without exception are thriving and in apparent perfect health, and that they have lived several years since the operation was done and have gained in weight, in height, and in every way seem well and happy. The investigation makes it clear that the alimentary canal has a power of adapting itself to the changed conditions of an obstructed pyloric outlet and the presence of a patent gastro-enterostomy stoma. The question of the persistance of the pyloric tumor after gastro-enterostomy is one of considerable importance. There is no doubt that for a while the gastro-enterostomy wound relieves the

acute starvation of the babies, but to determine the ultimate end of the condition, the *x*-ray was used to follow the course of food and in the various plates taken at different times after the operation up to five years, show that food passes through the stoma and not through the pylorus, which is interpreted as meaning that the tumor at least in the six cases of congenital stenosis examined, continued to obstruct after years of short circuiting. A case is also reported where at autopsy seven and one-half months after operation, death due to nothing connected with the stomach, the tumor persisted and showed microscopically as an hypertrophy of circular muscular fibers. He gives in his work a complete history of all these cases.

Nicoll has to report nine cases seen within the past six months and they are used to emphasize the importance of recognizing two degrees of pyloric obstruction in infants,—that is, minor ("spasm") to be treated by dieting and major ("hypertrophy") for which early operation alone is curative. They all presented persistent vomiting and obstinate constipation, ravenous hunger, extreme ultimate emaciation and peristaltic waves passing over a dilated stomach. In five of the cases the obstruction was recognized to be of a minor degree and dietetic treatment decided upon and followed, at least up to the present, with complete success. Vomiting ceased, constipation disappeared, and weight steadily approached normal. For feeding he offers no rules; often the food which would appear to be ideally the worst, succeeds when many theoretically perfect foods fail. He believes that frequent changes in food are necessary if a particular food does not "stay down" after a three-day trial it should be abandoned for another. If after three weeks' dieting, even in cases of apparent minor degree, vomiting still persists, dietetic treatment should be abandoned and the operation undertaken while strength remains. The patients were fed on a thin paste made by mixing flour which had been baked by the nurses, with milk. He believes that an undeservedly high reputation is given to diet treatment in these cases, and believes that this position is due to an erroneous diagnosis or a temporary improvement. Quite commonly vomiting can be kept in abeyance by systematic dieting to relapse even after many months. In the meantime the case may be demonstrated as a dietetic cure. A third reason for the frequent persistence in dietetic measures, is an exaggerated impression of the mortality attending operative treatment, and it seems that this erroneous idea is slow to yield to the proof of facts. Five of his cases out of six operated, recovered from the operation and were cured of the stenosis and all of these infants were treated as out-patients throughout before and after the operation. One case died of shock. He believes it essential to have an experienced operator and a medical advisor who brings resistent cases early and a nurse who is prepared to nurse the child "maternally" as well as "surgically." He believes it wrong to keep the infants flat in bed and allow them to cry and in this way exhaust themselves, but if nursed in the arm they often sleep and conserve their strength. As to the operation of choice, he believes the last word has not been said as far as the cure of the stenosis undoubtedly the best procedure is a combination of either pyloroplasty (V. Y. method) or divulsion with posterior gastro-enterostomy. This last operation presupposes a fair amount of vigor and each case has to be judged on its merits, both in degree of stenosis found on exposing the stomach, and the condition of the infant's health. The possible procedures open to the surgeons are combined gastro-enterostomy and pyloroplasty or divulsion, and this is probably the best operation, but can only be successfully performed on strong infants. Divulsion, which was the

method used in Nicoll's earlier cases, he considers the simplest of the operations. The stomach is opened on its anterior wall, a pair of dressing forceps pushed through the pylorus and forcibly opened till the peritoneal coat of pylorus tears widely. The gastric wound is sutured. The V. Y. pyloroplasty is peculiarly suitable, he believes, inasmuch as the great thickness of the muscular coat and the laxness of the submucous coat permit of the operation being done entirely "submucous," a point that has not been appreciated by some critics whose experience of the operation has probably been confined to the adult, or non-hypertrophied pylorus. Posterior gastro-enterostomy has a wide field of application. The addition to divulsion or pyloroplasty of gastrostomy by way of an opening in the anterior wall of the stomach, through which a rubber catheter is passed through the pylorus into the duodenum, the catheter being fastened by sutures to the skin wound, is often advisable. For some time Nicoll has not made use of this measure, having adopted in much emaciated infants appendicostomy in its stead. As an auxiliary measure, the author has found appendicostomy not only superior to gastrostomy, but also to continuous recto saline infusions. In young infants, as a rule, rectal saline infusion is impracticable.

Berend reports 2 cases in his own family with severe symptoms. In the first child the weight dropped from 3,050 grm. at birth to 1,800 in less than three weeks, and operative treatment became necessary. Loreta's divulsion was done; the hard contracted pylorus relaxed in the surgeon's hand during the operation, but it was still unusually thick although there was no trace of organic stenosis. The explosive vomiting continued as severe as before, the divulsion having evidently done no good, and the child growing constantly worse, the pylorus was incised and a catheter was introduced through the mouth and passed through the pylorus into the duodenum. By this means it proved possible to feed the infant and recovery soon followed, all trouble being over by the time the child was six weeks old; it is now three and a half years old and perfectly healthy. The disturbances in his second child were not so severe; the pylorus was never palpable and the syndrome disappeared under medical measure alone. The first symptoms in both cases were the uneasiness in nursing so that the children were unable to empty the breast, and the protuding stomach, this protusion of the stomach region and difficulty in nursing sustaining the assumption that the spasm of the pylorus is the primary disturbance. Peristalsis in the stomach was noticed four days later and the tumor, the size of a hazel-nut, in the pylorus region by the end of the week. He recognized the true trouble from the start and kept a detailed record of all the data, especially the amount of fluid ingested and vomited each day. Notwithstanding the severe derangement from the pylorospasm, the organism tenaciously maintained its normal water balance. He is inclined to ascribe the whole trouble to a lack of balance between the antrum and the masculature of the fundus of the stomach; when the innervation of both becomes normal then all disturbances from this source ceases. At birth there is neither spasmodic contraction nor hypertrophy of the pylorus, merely the predisposition. Winternitz discusses the cases from the surgical standpoint, calling attention to the extreme retraction of the muscular pyloric ring after the lengthwise incision, indicating excessive tonicity in the muscle. The pylorus was incised over the tube introduced from the mouth; this allowed ample nourishment from the first and the child began to gain at once. The retention pylorus catheter has proved successful in other cases in his hands, but he warns that it should not be left *in situ* longer than two days.

PRACTICAL MEMORANDA.

A department for the presentation of new or but little known points in diagnosis and differential diagnosis; therapeutic observations; special formulae; medical, surgical and laboratory technique; and new instruments and appliances.

AN EXACT METHOD OF OUTLINING THE LIVER.

The following procedure, first suggested to me by Dr. John D. Long, is useful not only in determining the size and position of the liver, but is applicable also to the spleen, heart, tumors of different sorts, etc. Place your stethoscope on the surface of the body about the centre of the area of liver dullness. Then strike a large tuning-fork against the iron bed or other convenient object, causing it to vibrate. Set the end of the handle of the fork on the surface of the body at a point beyond the border of the liver area, moving it carefully toward your stethoscope until the singing note of the fork is heard. In this way the organ may be outlined with almost mathematical exactness. It should be said that bone, of course, will also transmit the sound, so that in working down the back and chest the handle of the fork should not be placed on the ribs.

CREIGHTON WELLMAN, M. D., Oakland, Cal.

ON THE CHOICE OF A DRAIN.

In view of the fact that a large percentage of wounds require drainage, the choice of a drainage material is always an important one. The idea must be to secure material which will accomplish all that is necessary with the minimum of damage and of discomfort. The older drainage-tubes, whether of metal, hard rubber, or glass, have been used less and less as time has demonstrated the danger of pressure necrosis following their use. A glass tube was broken into a number of pieces in the abdomen of one of my patients and I am sure that one such experience is enough for any surgeon.

Soft rubber tubes probably possess all the virtues of those just mentioned and are less likely to do damage; hence, they have a well-deserved popularity. Some persist in using gauze, although it is pretty well shown that it does not drain to any great extent and becomes exceedingly foul, if left in the wound for any length of time. A combination of gauze and rubber or gutta-percha tissue in a form of the well-known cigarette drain is no doubt better than gauze alone, but in my opinion distinctly inferior to soft rubber used by itself. For a year or two I have used strips of rubber dam, or portions of worn out rubber gloves, to the practical exclusion of every other material in wounds, no matter where situated.

FOOTNOTE: These "Memoranda" are contributed to the INTERSTATE MEDICAL JOURNAL by the authors to whom they are credited.

Where it is possible, as in superficial lesions, these are used through and through, both ends being anchored to the skin. In abdominal work, such a drain is anchored to the stump of the appendix or the cystic duct by a strand of fine cat-gut, and the other end caught in an ordinary skin clip.

WILLARD BARTLETT, M. D., St. Louis.

A MODIFICATION OF ROSE'S ADHESIVE PLASTER BANDAGE.

In many cases of general visceral ptosis, the selection of an effective abdominal support is a very difficult matter. A modification of Rose's adhesive plaster bandage has given me much satisfaction, particularly in thin subjects where abdomens are so depressed that a serious obstacle is presented to the adjustment of a proper support to the displaced viscera. My modification consists in the use of narrow (two-inch) strips. The pubic hair is thus avoided, and much less surface is covered than by Rose's bandage. The patient is therefore more comfortable and enjoys more freedom of movement.

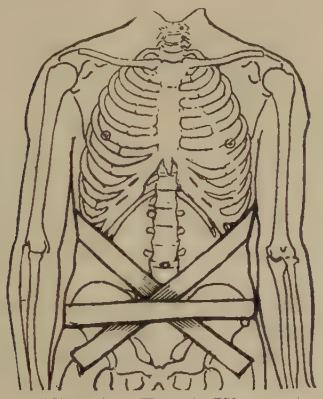

Fig. 1. Front View.

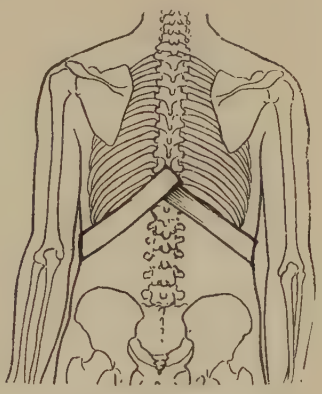

Fig. 2. Back View.

The method of applying the bandage is as follows:—The patient sits up on a couch, the adhesive strip is fastened to the dorsal vertebræ and follows the right lower rib margins; the patient now lies down, the lower abdominal contents are pushed upward with the operator's left hand while the bandage is carried across the abdomen and attached to the left side at Poupart's ligament. The patient again sits up and a second strip is applied to the other side in exactly the same way as the first one. Finally a third strip it attached across from one superior iliac spine to the other, the patient lying down.

The bandage can be worn comfortably for two weeks. Bathing is not interfered with. It is easily removed by gasoline and benzine, or, as Dr. E. J. G. Beardsley (*Jour. Amer. Med. Assoc.*, Vol. LVI., No. 4) has recently recommended, by oil of wintergreen. The bandage may be reapplied immediately, or in the event that irritation of the skin occurs, an interval of several days may elapse before replacing it.

HORACE W. SOPER, M. D., St. Louis.

A METHOD FOR DETERMINING THE SPECIFIC GRAVITY OF VERY SMALL QUANTITIES OF MOTHERS' MILK.

The analysis of human milk often becomes a matter of great importance in the adjusting of difficult feeding cases. By means of the small, reduced Babcock tester, which can be fitted to any ordinary centrifuge, it is possible to determine the fat content of human milk, less than 3 c.cm. of milk being required. If the fat content and the specific gravity of the milk be known, the proteid content can be very accurately estimated by means of the Richmond formula for the total solids. This formula reads as follows:—

Total solids = 6/5 of fat content in figures, plus last 2 figures of specific gravity divided by four, plus the decimal .14.

$$\text{T. S.} = 6/5\ \text{F.} + \frac{\text{sp. gr.}}{4} + .14.$$

Example. Fat content of a given specimen 4.5 per cent.
Specific gravity 1030.

$$\text{T. S.} = 6/5 \text{ of } 4.5 + \frac{30}{4} + .14 = 13.04.$$

The sugar content being assumed as constant at 6.5 and the salts constant at 0.2 we obtain the following figures:—

Total solids	13.04
Fat	4.5
Sugar	6.5
Salts	.2
	11.2

From which it will be evident that the proteid content of the supposed specimen would be 13.04 — 11.2 = 1.84 per cent.

The difficulty in carrying out the analysis lies in the fact that very often the mother is unable to express an amount large enough to enable the specific gravity to be taken.

For such cases the author has devised the following method which has proved absolutely satisfactory for a number of years:—

A mixture of chloroform and benzine (which are miscible in all proportions) is made and the specific gravity of the mixture determined. The chloroform being comparatively heavy and the benzine light, a mixture of any desired specific gravity can easily be obtained. The specific gravity of normal human milk varies from 1028 to 1031. A mixture having some such specific gravity being made, a drop of the milk to be tested is allowed to fall into the mixture. The drop in the mixture will retain its perfect contour. If the specific gravity of the milk be heavier than that of the mixture, the globule of milk will sink to the bottom of the vessel; if the milk be lighter than the mixture, it will float on its surface. By adding small quantities of either chloroform or benzine, the specific gravity of the mixture may be changed, until it is found that the drop is just *suspended* in the middle of the mixture. The specific gravity of the mixture will then represent the exact specific gravity of the milk. By this method, the specific gravity of even one drop of milk may be obtained and analysis of even a teaspoonful of mother's milk is possible.

It should be added that this method of estimating specific gravity is really the Haumarsten method for obtaining the specific gravity of the blood. By experiment, the author has found that the method is perfectly applicable to milk.

ALFRED FRIEDLANDER, M. D., Cincinnati.

THORACIC FLUOROSCOPY IN THE DIAGNOSIS OF MEDIASTINAL AND SUBPHRENIC DISEASE.

There are many pathological processes in the mediastinal and subphrenic regions that defy clinical diagnosis. Very frequently the symptoms and signs based upon clinical and physical methods are so indefinite or so insufficient that an accurate recognition of the disease is impossible. It is in these conditions that the fluoroscope proves a most valuable aid to the other methods of diagnosis, and in many instances a fluoroscopic examination is absolutely essential towards the correct recognition of the diseased process. In thoracic examination it cannot be expected that observations made in one position will possess a high degree of accuracy. Owing to the relative position of the thoracic organs, it is most important to view the chest from as many angles as possible. It frequently happens that the shadows projected from a certain aspect of the chest appear entirely normal, whereas a slight change of position will manifest the presence of some abnormality which might have escaped detection. It is most important that the examiner acquaint himself with the variations of shadows in the different positions.

In the systematic examination of the thoracic region, the author places the subject in the following positions:—(1) Direct antero-posterior, with the screen placed against the anterior chest wall; (2) antero-posterior, with the screen in contact with the posterior wall; (3) oblique (antero- and postero-lateral) on right and left sides; and (4) antero-posterior or lateral recumbent. The antero-posterior position finds its greatest usefulness in lesions of the lungs, aortic arch, and diaphragm. Changes in the contour of the diaphragmatic shadows are of great value in differentiating pleural lesions from subphrenic abscess. In the oblique position there is normally a light area situated between the vertebræ and large vessels—the prevertebral space A. Small aneurysm of the aortic arch and a tumor in the superior mediastinum, both of which may be indiscernible in the antero-posterior position, obliterate the upper part of the light area and are thus recognized in the oblique position. In latent aneurysm of the descending aorta, which is covered in front by the cardiac shadow, there is frequently a loss of light in the lower part of this area. Chronic inflammatory conditions and empyema of the mediastinum usually darken the middle and lower portions of the pervertebral space. WM. ENGELBACH, M. D., St. Louis.

PREPARATION OF BONE-WAX.

A convenient method of preparing bone-wax and putting it up so that it remains sterile and always ready for use, is as follows:—Eight drams of white wax are melted in an evaporating dish, over a low flame. When melted, one dram of oil of sweet almonds and one dram of salicylic acid are added and the mixture well stirred, brought up to a boil, and then poured into previously sterilized glass-tubes, about three-eighths of an inch in diameter and three inches long. These tubes should be filled with the mixture only for two-thirds of their length. The open end of the tube is sealed in a flame and the tube is well shaken while the mixture cools. The tube is filed at its middle, so that it can be easily broken when the wax is needed. The wax is extracted with a small bone curette. M. G. SEELIG, M. D., St. Louis.

OBITER DICTA FROM FOREIGN JOURNALS.

RATS AND THE PLAGUE.

Medical men throughout the world have recently read, with more than usual interest, accounts of the outbreak of rat-plague in East Suffolk, England. That a similar invasion is highly probable at any time in various parts of the world should have a significance that must not be too lightly weighed by the medical profession. In the *Revue de Paris* of February 15th, is a lengthy article bearing on this subject by Dr. Norbert Lallié, and since what he says is really one of medical questions of the day, an excerpt may not be inadvisable. Dr. Lallié writes:—

On account of its migrations in all parts of the civilized world during the last two centuries, the rat is to-day the object of an antipathy that is well merited. It is true that the black rat (Mus rattus) existed in France even in the earliest times. But in spite of its undesirable qualities and its fecundity, its unpopularity was not matter for public complaint. The development of maritime commerce at the beginning of the fifteenth century, however, caused the brown rat (Mus norvegicus)—the migratory or sewer rat—to appear in Europe. Indigenous to China, or more probably to India and Persia, it invaded Europe by land and sea.

This hostile intrusion was favored in 1727, by a devastating famine which swept over India, and by the violent earthquakes which rocked Persia and the whole country around the Caspian Sea. Thereupon, the migratory rat set out in hordes toward the west, crossing the Volga, near Astrakhan. In 1731 it made its appearance in England, coming direct by sea from India. In 1750 the port of Odessa was invaded; thence, meridional and central Russia, the Balkans, Austria and the south of Prussia. Leaving the north of France, it soon got a foothold in Paris. Evidently the French capital was to its liking, for toward the end of the eighteenth century this species was swarming. The Government showing a disposition to transfer the charnel-house of Montfaucon to the suburbs of Paris, great was the outcry of the people in the neighborhood, for the dread was upon them that with the removal of this repository for dead animals, they themselves would be attacked by the famished rats! "It is the custom," says Bell, "to dump about thirty-five carcasses of horses daily into this place. The following day nothing remains but the bones." But the fear of the people was exaggerated, for by adroitly closing all the exits of the enclosure 16,000 rats were killed during the first month.

The migratory rat arrived in Sweden in 1790, in the south of Germany in 1800, in Switzerland in 1809. In spite of the rigors of winter it soon penetrated into the most northerly parts of Finland, where it is to-day quite as numerous as elsewhere. It has been in Denmark since 1790. For some time the sea passage, Limfjord, proved an obstacle to its advance into the northern portion of Jutland, but this was soon overcome as is

evidenced in the following anecdote. One night in autumn two fishermen, whilst seated in their boats, saw to their great surprise that they were completely encircled by a multitude of rats which were swimming with all their might toward the island of Thisted.

In 1735 English vessels brought the rat to North America and later to South America. But even until 1825 it remained in the vicinity of the Atlantic seaboard and, what should be noted, the regions around the Upper Missouri were free from it as late as 1870. In 1900, however, the migratory rat was at home in all parts of the United States and Canada, the restrictions in the latter country being only the excessively cold and icy districts in the extreme north.

A remarkable fact is that wherever the migratory rat has established itself, it has exterminated the black rat. Arthur Delisle, who has made a study of rats during the last forty years, says: "Almost everywhere in Europe, brown rats have driven the black rats away from the cities, and after this have pursued them into the open country and almost annihilated them. The vanquished species is no longer found in farmhouses, chateaux, or villages. If it has not as yet completely disappeared from all countries, the fault may be attributed to the slowness and sluggishness of its rival." This extermination of the black rat by the brown rat, in default of other proofs, would show that the latter is the stronger, the more voracious, the more redoubtable. The body of the black rat is 18 cm. in length; that of the brown is from 20 to 24 cm. The damage done by the former is insignificant compared with what is wrought by the latter. The black rat nourishes almost exclusively on vegetables; the brown is both carnivorous and herbivorous. It is of little importance to the latter whether the food is fresh or putrid. No other mammifer is so voracious, so omnivorous.

The brown rat acclimatizes itself equally well in all latitudes. The West Indies, the Azores, and Cape Verd Islands suffer from its ravages. It devastates coffee and sugar-cane plantations, banana and orange groves, as well as the fruit orchards in all countries.

Is it true, as has so often been mentioned, that the rats which multiply to excess devour each other? Bouffon was of this opinion. But the facts show that only when famished rats are confined to a cage do they resort to these desperate measures; otherwise, their ingenuity for procuring nourishment leaves nothing to be desired. In the Humber estuary, which lies between Yorkshire and Lincolnshire, England, there is an island of some 600 acres which for twenty years had yielded excellent pasture for many head of cattle. At present the rats are in possession of it, having traveled the distance of 450 metres which separates it from the opposite shore. They are so numerous that it is almost impossible to step anywhere without sinking into a hole. They have destroyed the crops and completely dissipated all signs of verdure. Attempts have been made to drive them away by inundating part of the island; but this procedure proved ineffective, for directly the water receded they quietly stole back from their retreat on the slopes, where they had tranquilly rested until such time as a return might be attended with safety.

Calmette, who is at the head of the Pasteur Institute at Lille, cites the following rather unusual incident. On the Scilly Islands, in the English Channel, the rats are so numerous, even on the islands uninhabited and deserted and on which only lichen, moss, and stunted brake grow, that one is justified in asking what their nourishment can possibly be. One day it occurred to an inquiring mind to dig the soil around one of the

burrows, when to his astonishment he found sixteen crabs. In another he came across no fewer than eight. They were all crabs of considerable proportions. They could not have reached the spot unassisted, for their claws were cut to the roots. The only explanation that could be arrived at was that the rats were in the habit of seizing the crabs in low water and before dragging them into their lairs maiming them by biting off their claws. The crabs when discovered showed every evidence of life and made a pitiful spectacle by the desperate manner in which they agitated their stumps.

Numerous anecdotes have been related which show that rats are not averse from attacking man. Nielson, in his book on Scandinavian fauna (1847), relates the incident of an old man who fell asleep on a haystack which the rats had undermined. Two days later a skeleton completely denuded of flesh was found. Stephenson, an English parliamentarian, reports a similar occurrence in a coal-mine near Killingworth. In this mine a number of horses were used. Now it happened that on festival days the horses and their fodder were brought up from the mine and the shaft temporarily closed. On this particular occasion the festivities lasted some twelve days. When the shaft was reopened the first man to descend was immediately assailed and devoured by a multitude of rats that had been deprived of nourishment during all this time. It is well known that young children have been attacked during sleep and severely wounded. Without dwelling at too great length on this gruesome subject, it would be well to add here that rats have a decided liking for fresh meat, and devour by preference pigeons, chickens and young ducks.

One cannot insist too much on the damage caused by the rat. This can be reckoned only with difficulty. Boelter, in his book entitled "The Rat Problem" (London, 1909) gives an account of his experiences with rats when caged. Each cage contained three brown rats, to each of which he gave daily a halfpenny's worth of food. In each cage he placed a small quantity of straw, hay, and rubbish; also a piece of brick or a bone so that the rodents could sharpen their teeth by nibbling Their nourishment was that which they would have had had they been at liberty: bread, potatoes, carrots, turnips, cooked or raw meat, fish, eggs, poultry, and the debris from the table. Three rats in the same cage were alternately fed on vegetables or only meat, or received a mixed diet. The results were always the same. At the end of some days the rat that was least strong was found dead, partly devoured. A short time after, one of the survivors devoured the other. The last survivor was generally a female that in turn became heavy and dispirited and showed vivacity only when the quantity of food was increased. The rats examined after death were very emaciated; a fact which shows that a caged rat cannot live in a normal manner on a halfpenny's worth of food a day.

This expense is greatly increased by the damage done by the rat when at liberty. To ascertain an approximate estimate of what the damage really is, Boelter conceived the idea of sending thousands of letters throughout England, addressed to farmers, shopkeepers, grocers, *restaurateurs*, hotel-keepers, inspectors of docks and mines, sanitary officers, etc.; in short the principal sufferers from the rat. The questions pertained to what places were being invaded by the rat; the conditions which favor its increase; the value concerning damaged food commodities and all losses, whether animal or otherwise; the means of defense: traps, poison and bacterial preparations; the danger of using poisons;

the number of rats destroyed and the best means for their destruction; and, finally, the number of rats in a place as judged by the area and number of inhabitants.

The most important question was, Should the damage effected by the rat be valued at a farthing a day? Ninety-nine out of every hundred answers deemed this valuation about right; the minority thought it too low. One correspondent expressed the opinion that since the rat's depredations were so varied, an estimate could not be made. Added to this the rat exercises so much ingenuity in getting what it wants, that for mere man to judge its thieving acts, with any degree of correctness, he needs must be decidedly on the alert. La Fontaine puts this pertinently in the fable "The Two Rats" when he says: "While one rat clutches the egg and rolls and stumbles, the other seizes it with its tail and drags it off."

Nothing could be more exact. Other anecdotes have it that the rat has repeatedly been seen carrying eggs to a safe hiding-place under steps and porches, without the slightest break to mar the success of the expedition. But soft, alluring foods do not seem to appease altogether its destructive and predatory qualities, for it is well known that gas- and water-pipes have often fallen victims to its machinations. About the hardest material that a rat is known to have attacked is the billiard-ball, which, while en voyage from Uganda to England, was partly gnawed away by an omniverous rodent. Perhaps for all we know it may have regarded the particles of ivory as a new and refreshing *hors-d'œuvre!*

Our modern ships of vast proportions and great tonnage offer to hordes of rodents a refuge that is wellnigh perfect. Attempts have been made to show what the losses are in the matter of grain, flour, bacon, and cheese, during their transportation. It has been asserted that the daily loss due to each rodent amounts to nine centimes. On this basis what is not the annual loss in money! In the British Isles, for instance, the number of rats equals the population, which is some 40,000,000. In London alone there some 6,000,000 people, and calculating on the basis that the ravage done by each rat is even less than nine centimes a day, the figures approach the enormous sum of 375,000,000 francs annually. According to the Secretary of Agriculture in the United States the loss to that country is 500,000,000 francs, and in Germany we are told by the Minister of Agriculture, the estimate is 250,000,000 francs.

Truth to say, if the ravages wrought by the rat were limited only to material losses, there might be some excuse for the negligence in exterminating this rodent. It may be but right for man to divide the result of his toil with all animals. But the migratory rat is the propagator of contagious diseases.

In the front rank of these diseases the plague should be mentioned. In the Orient, as is known, this disease is endemic throughout the year. The number of deaths in India, according to statistics, was 1,204,194 in 1907, and 117,000 during the first eight months of 1908. A communication, read at the annual meeting of the British Incorporated Society for the Destruction of Vermin in 1907, contained the following warning: "The plague is at our doors; it has entered our ports, though it must be admitted that the vigilance of our sanitary officers has stopped its progress; but at any time our commerce may bring it to us, and what with our hordes of rats, there is no reason for the disease not to become epidemic. When once it has gained a foothold, its extirpation will be no easy matter." Dead rats infected with the plague were found in the London

docks in 1908, and had it not been for the energetic measures which were at once instituted, an epidemic might not have been averted.

The rat is easily attacked by the plague, and in countries where the laws are deplorably lax and poverty reigns, it is a matter of short duration before man gets the disease. How does the rat contract the plague? Evidently in the soil, where the plague bacilli remain for a considerable length of time in a weakened virulent state. The rat being peculiarly sensitive to the disease, it would seem that no matter how weak the virus is when it enters its body, directly this takes place the disease manifests itself in all its virulence. In 1898, Dr. Simond was sent by the Pasteur Institute to Bombay to study the disease. He discovered that the rats, even when they did not die, were excellent carriers of the plague in its chronic form. Thus it happens that even after the disease has entirely disappeared from a locality, the rodents may conserve it in a latent state.

The rat-flea, the intermediary between the rat and man in the propagation of the plague, can remain infectious from fifteen to eighteen days. One of ordinary size has a stomach half a cubic centimetre in dimension, which can contain five thousand plague germs.

Other diseases attributable to the rat are trypanosomiasis and trichinosis. Wherever there is an epidemic of trichinosis, a number of rats can be found affected with the disease. Swine are not averse from eating dead rodents or food contaminated by their excrement, and thus it can be easily understood how the eating of diseased pork carries the disease to man. The female trichina is most productive, since at the end of six or seven days it produces in the stomach of an infected hog some 1,500 embryos. These embryos attach themselves to the walls of the intestines and thence pass into the voluntary muscles. One hog can infect a number of people, as was instanced in Hadersleben, Germany, in 1865, when 337 inhabitants were stricken.

DIAGNOSTIC AND THERAPEUTIC NOTES.

THE TREATMENT OF POST-OPERATIVE ILEUS.—Kappis (*Muench. med Wochenschr.*, 1911, No. 1). Westerman (*Zentralbl. f. Chir.*, 1910, No. 10). It has long been known that one of the indispensable procedures in the treatment of ileus, whatever the origin of the latter, is persistent gastric lavage. Westerman effectively replaces this by means of continuous gastric drainage. A long thin stomach tube, not too soft, such as is used in the forced feeding of the insane, is well lubricated and passed through one nostril, down the esophagus into the stomach. With a little persistence this can readily be accomplished. The tube is filled with water and, while full, its free end is immersed into a vessel partly full of water. Thereupon the latter is set down on the floor by the side of the bed. The siphonage begins at once, continues as long as the stomach contains fluid and begins again as soon as fluid enters the stomach. The latter is in this way kept continuously empty, not only to the great comfort of the patient but also to his objective improvement. Ructus, singultus and retching cease at once. The torturing restlessness disappears and the dangerous gastric distension is permanently relieved. An additional advantage is that the patient may drink water freely. The water is promptly evacuated through the tube, but the permission to drink freely adds greatly to the patient's comfort.

A SIMPLE TEST FOR BLOOD IN THE URINE.—Wackers (*Muench. med. Wochenschr.*, 1911, No. 4). While the detection of considerable amounts of blood in the urine is a simple matter, the test for traces is much more difficult and usually necessitates extraction with acetic acid and ether. A small amount of the urine (10 c.c. usually suffices), is filtered in the usual manner. Before the last few drops of urine have left the filter, a little acetic acid is added and then a mixture of tincture of guaiac and ozonized turpentine poured on. A blue color appears almost at once, if blood be present. This modification is far more sensitive than the original guaiac-turpentine method, even if the latter is used after extraction with ether. It is only in dilutions as high as one drop of blood to ten litres of urine that the test fails. Indeed, in certain cases its very sensitiveness may be a disadvantage. Practically the only source of error is the presence of pus in the urine. The latter, however, does not interfere if the urine be boiled for a moment before subjecting it to the test. In this case, however, it must be cooled before testing it, as hot urine will give a positive reaction even in the absence of blood.

TUBERCULIN TREATMENT IN CHILDHOOD.—Escherich (*Wien. med. Wochenschr.*, 1911, No. 1). Escherich considers it of the highest importance to diagnose tuberculosis in children as early as possible, best by

means of the biological tests, such as the cutaneous reaction, and to begin treatment by means of tuberculin injections at once. The mode of treatment, advised by him, differs radically in children and adults. For adults and for advanced cases in late childhood, he advocates the use of doses small at first but gradually increasing. This increases the local inflammation and aids the process of immunization. In young children, on the contrary, he advises the injection, for periods of two or three months, repeatedly of the same small dose, thus producing not an immunization but an anaphylactic process. This method is especially useful in the numerous cases of chronic juvenile tuberculosis, with slight or no demonstrable lesions, but evidenced by toxic manifestations and a positive cutaneous reaction. In apparently cured cases, this procedure seems to offer some guarantee against relapse. It presupposes the absence of severe anatomical lesions and a good state of general nutrition. The usual constitutional treatment is therefore not to be neglected. The good results of the method are often prompt and are evidenced by an improvement of the general condition, the appetite and the weight, a cessation of fever and nightsweats and a lessening of the cough.

The Antiseptic Influence of Medicaments Upon the Bile.—Knick and Ringsheim (*Deutsch. Arch. f. klin. Med.*, Vol. 101, Nos. 1 and 2). The writers have tested a great variety of drugs in regard to their antiseptic action, when administered internally, upon the contents of the gall-bladder. As might have been expected, the great bulk of these, such as calomel, salicylic acid and oil of turpentine were entirely inert. The drugs exerting the strongest antiseptic action were menthol and hippol (melthylene-hippuric acid); urotropin was active only in much larger doses.

The writers' results, especially as regards menthol, are entirely in accord with our own experience. Of all the so-called intestinal antiseptics we have found menthol the only one worthy the name, if we except thymol in toxic doses. Menthol may conveniently be administered in a 40 per cent. solution in olive oil. Of this 10 to 20 drops may be given three times daily or oftener, best in double gelatine capsules. The latter precaution is essential as menthol produces an unpleasant burning sensation in pharynx and esophagus.

A Reaction in the Urine of Breast-Fed Children.—Engel and Turnau (*Berl. klin. Wochenschr.*, 1911, No. 1). The urines of breast-fed and bottle babies may be distinguished by the following procedure:—To 10 c.c. add 1 c.c. of a 2 per cent. solution of silver nitrate and set aside for ten minutes. If the precipitate darkens rapidly and becomes black, the urine is from a breast-fed baby. If it remains white or darkens but slightly, the child is being artificially nourished. While perhaps not of great practical importance, the test, which seems well established, is of so much interest that it warrants notice.

CORRESPONDENCE

PARIS LETTER.

CURATIVE VACCINATION FOR STAPHYLOCOCCIA.

By Auguste A. Housquains, M. D.

The successful undertakings of Sir Almroth Wright have been an incentive to the further study of vaccines. It was Wright who was the first to inoculate man, and for his therapy he employed an emulsion of heated sterilized staphylococci. Influenced by this fact, Mauté in France undertook a series of researches which has resulted in a method which, though not perfect, is without doubt of considerable excellence in the treatment of staphylococcia and furunculosis.

The active immunity conferred by the vaccines is, as one knows, of longer duration than that which follows the injection of serums. The action of the latter being transient, Mauté applied his researches to the study of antistaphylococcic vaccine, by which means he realized an efficacious and durable therapy for furunculosis. Mauté has published the technique and the therapeutic application of vaccine as well as the therapeutic results which he has achieved.

The antistaphylococcic vaccine consists of a sterilized microbian emulsion which is preserved in sealed tubes. Under the name of stock vaccines the English laboratories deliver to the doctors specialized vaccines, such as acne, furuncle, anthrax, or the bacteriological variety (staphylococcus albus and aureus). Mauté prefers the autogenous vaccine, that is to say, one prepared for each disease from that particular strain of the bacterium already producing the infection of the patient. It is only by employing the autogenous vaccine that one can obtain a perfect specialization and a remarkable constancy in the results. Even from a theoretic point of view, this manner of procedure is completely justifiable because, as one knows, the chromogenic power of the staphylococcus does not alone suffice to differentiate the different varieties of the disease. On the contrary, it is necessary to modify somewhat the biological qualities of a microbe so that it may live in an organism. We know that the staphylococci, though they produce similar lesions, are not identical from the point of view of their virulence; hence, what is most important to remember is the condition of the patient who is about to be subjected to treatment. Moreover, the criterion is furnished by observation and clinical results. The results furnished by the autogenous vaccines are, according to Mauté, incomparably the best. In certain chronic cases in which the same treatment should be prolonged if good results are desired, it is well at times to try a new vaccine, not because the first has not con-

served its primitive qualities, but because the pathogenic organism may change its type so as to adapt itself better to other immunizing products.

The two sorts of vaccines may be employed simultaneously. The strength of the vaccinal product is calculated by the number of bacilli contained in each cubic centimetre. The injection itself has no special indication. It must be made under the skin, by preference in the thigh, according to the usual methods of asepsis. When done in this way there are no local complications.

As regards the doses, Wright thinks that we ought to calculate them according to the modifications in the opsonins, that is to say, by ascertaining an opsonic index. Mauté is of the opinion that this is necessary. He employs a vaccine of 500,000,000 to the cubic centimetre. The first dose is one-fourth of a cubic centimetre, followed at an interval of five days, by a dose of one-half cubic centimetre. Six days later he employs a dose of one cubic centimetre. Intervals of seven, ten and fifteen days should occur, during which the doses are increased to two and sometimes to three cubic centimetres. One can easily understand that the determining of the frequency and quantity of the injections should be based on the local and general reactions presented by the patient. No harm is done by prolonging the treatment, and it is even advisable to make from four to five injections after the disappearance of the lesions.

The local reaction is almost *nil*. All that can be noticed in certain cases is a slight redness or a slight tumefaction which appears at the end of twelve or twenty-four hours. The pain is absent, or if present, very slight. It is well to make the injection deep under the skin. In furunculosis there appears at times, at a point of injection, a real reaction which results in furuncles that develop rapidly. A number of these, which seem quiescent, suppurate and the healing is rapid. The effect on the general condition is habitually *nil*; it is seldom that one notes in certain cases, fatigue with somnolence and heaviness of the head.

Although there is no therapy that is applicable to all forms of staphylococcic infection, the vaccine therapy, such as it is to-day, is most effective in the subacute or chronic forms as well as in the forms that have a tendency to recidivation. That is to say it is especially applicable to staphylococcia of the skin.

In inflammatory acne, be it phlegmonous and pustular, the suppurative tendencies are checked; the pustules being transformed into simple papules. In sycosis one often obtains good results by employing anti-staphylococcic vaccine; but here local treatment is necessary and all causes of direct irritation should be abated.

March 10th.

BOOK REVIEWS.

THERAPEUTIQUE CLINIQUE DE LA SYPHILIS. Par E. Emery, Médecin de Saint-Lazare, Ancien Chef de Clinique a l'Hopital Saint-Louis, et A. Chatin, Médecin des Eaux D'Uriage. Paris: Masson et Cie. 1909. Price, 10 fr.

This is an eminently practical and interesting book. There is yearly a great mass of literature published upon syphilis, but the profession is in need of practical, concise treatises upon the various phases of this protean disease. A work such as this one is timely and should have an English translation. It virtually exhausts the subject of the therapy of syphilis up to the time it was written, devoting a full discussion to all the methods of giving mercury and the various salts used, especially by injection. The book is composed of 600 pages, entirely devoted to the therapy of syphilis in all its phases, giving detailed and explicit directions for every possible indication. It is divided into two parts. The first is consecrated to the study of the remedies used as antisyphilitics, their mode of administration, and to the treatment of syphilis in general. In the second part the authors discuss the treatment of the local accidents of syphilis, those of the skin, the mucous membrane, and the principal visceral manifestations. The whole work is clearly written, precise and highly practical. It is a pity it was written before "Salvarsan" was discovered; for if this drug were discussed in the same spirit, as are the other subjects, the work would indeed be complete.

LES MALADIES DU CUIR CHEVELU.—III. Les maladies cryptogamiques: les teignes, par le Docteur R. Sabouraud. Paris: Masson et Cie. Price, 30 fr.

This is the third volume of an exhaustive work on the diseases of the hairy skin, and is entirely devoted to the cryptogamic or fungous diseases of that region. The volume consists of 855 pages with 433 figures and 28 plates. Sabouraud here attempts to separate and identify all the parasites discovered and to establish their relationship and clinical types. It is a colossal and wonderful work and must remain a classic. Part I. is devoted to the history of the subject; Part II. to methods and technique of study; Part III. and IV. to ring worm; Part V. to favus; Part VI. to the study of the comparative mycology of these dermatophytes; Part VII. to the biology; Part VIII. to treatment. Sabouraud's contributions to the study of the bacteriology of skin diseases are widely known. His skill in technique and his knowledge of biology, together with his unlimited facilities for study and abundance of clinical material, has enabled him almost to exhaust the subject and stand as the world's leading authority in this branch of dermatology.

The work is highly technical and exhaustive, yet is practical enough to hold the interest of those who are not out and out technicians.

DISEASES OF THE ANUS, RECTUM AND SIGMOID.—For the use of Students and General Practitioners. By Samuel T. Earle, M. D., Professor Emeritus of Diseases of the Rectum in the Baltimore Medical College, Surgeon in Charge of Rectal Diseases at St. Joseph's Hospital, the Hebrew Hospital, and the Hospital for Women. With 152 Illustrations in the Text. Philadelphia and London: J. B. Lippincott Company.

The writer has given in a concise and clear manner the more important and recent knowledge of the diseases of the anus and rectum. The book serves not only as a text, but also as a reference work. The work of others has been quoted freely, and in methods of technique and treatment they have been

quoted verbatim from the recent literature. The chapter on constipation is very complete. Much of interest could have been added to the study of the sigmoid. Special chapters on Lesions of the Coccyx and Congenital Idiopathic Dilatation of the Colon make a new departure for such works. Some of the illustrations are original, but the majority have been taken from older texts and from the original articles from which the quotations are made.

A Manual of Physiology with Practical Exercises. By G. N. Stewart, M. A., Professor of Experimental Medicine in Western Reserve University, Cleveland. Sixth Edition. New York: William Wood & Company. 1910.

This book has established for itself a too well-recognized place in the realm of medicine to need any introduction or even recommendation. The present edition is extensively revised with the addition of much that is new.

The description of the red blood-cells as biconcave discs is still retained. An interesting section is devoted to the description of the neurogenic and myogenic theories of the heart-beat, and while the author seems to favor the former, both sides of the question are freely stated.

A considerable amount has been added to the section on Internal Secretion. The latest advances in this subject of ever-widening importance are noted, and various conflicting views discussed. A short portion of the chapters on electro-physiology is devoted to the interesting subject of the human electro-cardiogram, and this entire chapter is worthy of careful study by those who wish to appreciate the recent work in the diagnosis of cardiac disease by this method.

A Manual of Chemistry, Inorganic and Organic, Adapted to the Requirements of Students of Medicine. By Arthur P. Luff, M. D., London, and Hugh G. H. Candy, B. A., London. Fourth Edition with 46 Illustrations. Chicago: Chicago Medical Book Company. 1910.

The work deals with those chapters in inorganic and organic chemistry, which most concern the student of medicine. The more important laws and theories underlying our system of chemistry are clearly and concisely explained. There are numerous instructions as to laboratory technique, accompanied by illustrations and diagrams. A more pretentious and practical exterior would enhance the value of the book.

Syphilis. By Sir Jonathan Hutchinson, F. R. S., L. L. D., F. R. C. S. New York: Funk & Wagnalls Co. 1910. Price, $3.00.

This is a new and enlarged edition of Jonathan Hutchinson's well-known work. No practitioner of medicine or surgery should be without this classic. The cases cited from a long life of close investigation and critical observation are alone invaluable. No one observer has added more to medicine and surgery and in more varied fields than the author of this volume. We only wish it were larger, as every page of it is of inestimable value to the reader.

Syphilis: Its Diagnosis, Prognosis, Prevention and Treatment. By Thomas Pugh Beddoes, M. B. B. C. Camb., F. R. C. S., Eng. New York: Paul B. Hoeber. 1910. Price, $2.00.

The volume consists of 224 pages, containing many statements rather loosely and carelessly made: as on p. 5, "in the skin accidental traumatism often causes ulceration," and on p. 9, "soft sores are due to infection by micro-organisms." What micro-organisms? Syphilis is also due to a micro-organism.

The book, as an exposition of advanced thought and work upon syphilis, falls short of the mark.

BOOKS RECEIVED.

TRUTHS—Talks With a Boy Concerning Himself. By E. B. Lowry, M. D. Chicago: Forbes & Company. 1911. Price, 50 cents.

THE RELIGION OF BEAUTY AND THE IMPERSONAL ESTATE. By Ralcy Husted Bell. New York: Hinds, Noble & Eldredge. Price, $1.25.

TEXTBOOK OF MASSAGE. By L. L. Despard, Member and Examiner Incorporated Society of Trained Masseuses. New York: Oxford University Press. 1911.

LA BASE DE TOUTE REFORME—La Régénération Physique et Mentale de l'Homme par la Réforme alimentaire. Par Otto Carque. Brussels: Paul Nyssens. 1911. Price, 2 fr.

TWENTY YEARS AT HULL-HOUSE—WITH AUTOBIOLOGICAL NOTES. By Jane Addams. Author of "Democracy and Social Ethics," etc. With Illustrations by Norah Hamilton. New York: The Macmillan Company. 1910. Price, $2.50.

HANDBOOK OF THE SURGERY OF THE KIDNEYS. By W. Bruce Clarke, M. A., F. R. C. S., Senior Surgeon to St. Bartholomew's Hospital. With 5 Plates and 50 Illustrations in the Text. New York: Oxford University Press. 1911.

INEBRIETY—A Clinical Treatise on the Etiology, Symptomology, Neurosis, Psychosis and Treatment and the Medico-Legal Relations. By T. D. Crothers, M. D., Supt. Walnut Lodge Hospital, Hartford, Conn. Cincinnati: Harvey Publishing Company. 1911.

A CAREFUL STUDY AND PRESENTATION OF MALARIA AND ITS MANIFESTATIONS—With the Most Thorough and Exhaustive Methods of Treatment of Any Work of its Kind on the Subject. By J. H. McCurry, M. D. Memphis: S. C. Toof & Co. 1910. Price, $1.00.

LA DECOMPRESSION CERERTALE PAR L'OUVERTURE DU CRANE ET SES INDICATIONS. Par Le Dr. Just Lucas-Championnière, Chirurgien honoraire de l'Hotel-Dieu, Membre de l'Académie de Médecine, Président de la Société internationale de Chirurgie. Paris: 8, Rue de Nesles. 1910.

DIE STOERUNGEN DER SPRACHE. VERSUCH EINER PATHOLOGIE DER SPRACHE. Von Dr. Adolf Kussmaul, Professor in Strassburg. Vierte Auflage herausgegeben von Professor Dr. Hermann Gutzmann, Leiter des Universitaetsambulatoriums fuer Sprachstoerungen in Berlin. Leipzig: F. C. W. Vogel. 1910. Price, 10 Mk.

LANDMARKS AND SURFACE MARKINGS OF THE HUMAN BODY. By L. Bathe Rawling, M. B., B. C. (Cantab), F. R. C. S. (Eng.), Surgeon With Charge of Out-Patients, Demonstrator of Practical and Operative Surgery. With Thirty-One Illustrations. Fourth Edition. New York: Paul B. Hoeber. Price, $2.00.

MANUAL OF CYSTOSCOPY. By J. Bentley Squier, M. D., Professor of Genito-Urinary Surgery, New York Post-Graduate Medical School and Hospital, and Henry G. Bugbee, M. D., Instructor in Genito-Urinary Surgery, New York Post-Graduate Medical School and Hospital. New York: Paul B. Hoeber. 1911. Price, $3.00.

ACCIDENTAL INJURIES TO WORKMEN—With Reference to Workmen's Compensation Act, 1906. By H. Norman Barnett, F. R. C. S. Surgeon, Cripples' Home, Belfast, etc. With Article on Injuries to the Organs of Special Sense. By Cecil E. Shaw, M. A., M.Ch., M. D. and Legal Introduction. By Thomas J. Campbell, M. A., LL.B. New York: Rebman Company. Price, $2.50.

DIE IMMUNITAETSWISSENSCHAFT. Eine kurz gefasste Uebersicht ueber die Immunotherapie and Diagnostik fuer praktische Aerzte und Studierende. Von Dr. Hans. Much, Oberarzt am Eppendorfer Krankenhause. Mit 5 Tafeln und 6 Abbildungen. Wuerzburg: Curt Kabitzsch. 1911. Price, Mk. 7.20.

PRINCIPLES OF PUBLIC HEALTH—A Simple Textbook on Hygiene Presenting the Principles Fundamental to the Conservation of Individual and Community Health. By Thos. D. Tuttle, B. S., M. D. Secretary and Executive Officer of the State of Health of Montana. New York: World Book Company. 1910. Price, 40 cents.

TRANSACTIONS OF THE FOURTH INTERNATIONAL SANITARY CONFERENCE OF THE AMERICAN REPUBLICS. Held in San Jose, Costa Rica, December 25th, 1909, to January 3, 1910. Washington, D. C.: Published and Distributed under the Auspices of the Pan American Union, John Barrett, Director-General, Washington, D. C. 1910.

OUTLINES OF PSYCHIATRY. By William A. White, M. D., Superintendent Government Hospital for the Insane, Washington, D. C. Nervous and Mental Disease Monograph Series No. 1. Third Edition, Revised and Enlarged. New York: The Journal of Nervous and Mental Disease Publishing Company. 1911.

COMPEND OF GYNECOLOGY. By Wm. Hughes Wells, M. D. Associate in Obstetrics in the Jefferson Medical College; Assistant Obstetrician in the Jefferson Medical College Hospital; Fellow of the College of Physicians of Philadelphia, etc. Fourth Edition, Revised and Enlarged with 153 Illustrations. Philadelphia: P. Blakiston's Son & Co. 1911. Price, $1.00.

THREE CONTRIBUTIONS TO THE SEXUAL THEORY. By Prof. Sigmund Freud, LL.D., Vienna. Authorized Translation. By A. A. Brill, Ph.B., M. D., Clinical Assistant Department of Psychiatry and Neurology, Columbia University. With Introduction by James J. Putnam, M. D., New York: The Journal of Nervous and Mental Disease Publishing Company. 1910. Price, $2.00.

A HANDBOOK OF PRACTICAL TREATMENT. By Many Writers. Edited by John H. Musser, M. D., LL.D. Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia; and A. O. J. Kelly, A. M., M. D. Assistant Professor of Medicine in the University of Pennsylvania. Volume I. Philadelphia and London: W. B. Saunders Company. 1911. Price, $6.00.

ATLAS OF MICROSCOPIC DIAGNOSIS IN GYNECOLOGY—With Preface and Explanatory Text. By Dr. Rudolf Jolly, Priv. Doc. Chief Physician of the Gynecologic Clinic University of Berlin. Only authorized English Translation. By P. W. Shedd, M. D. New York. With 52 Lithographs in Color and 2 Textual Figures. London: Rebman, Limited. Price, $5.50.

REMEDIAL GYMNASTICS FOR HEART AFFECTIONS—Used at Bad-Nauheim Being a Translation of "Die Gymnastik Der Herzleidenden" von Dr. Med. Julius Hofmann und Dr. Med. Ludwig Pohlman. By John George Carson, M. D., Edin., etc. Physician to the Sanatoria and Bad-Nauheim, Eversley, Hants. With Fifty-One Full-Page Illustrations and Diagrams. New York: Paul B. Hoeber. 1911. Price, $2.00.

HANDBOOK OF TREATMENT FOR DISEASES OF THE EYE. By Curt Adam, Assistant-Surgeon in the I. University Clinic for Diseases of the Eye, Berlin. With a Preface by Prof. von Michel, Berlin. Translated from the Second German Edition (1910). By William George Sym, M. D., F. R. C. S. Ed. and E. M. Lithgow, M. B., F. R. C. S. Ed. With Thirty-Six Illustrations. New York: Rebman Company. Price, $2.50.

DISEASES OF THE ANUS, RECTUM AND SIGMOID—For the Use of Students and General Practitioners. By Samuel T. Earle, M. D. Professor Emeritus of Diseases of the Rectum in the Baltimore Medical College, Surgeon in Charge of Rectal Diseases at St. Joseph's Hospital, the Hebrew Hospital, and the Hospital for Women. With 152 Illustrations in the Text. Philadelphia and London: J. B. Lippincott Company.